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=> D QUE
L2 21 SEA FILE=REGISTRY ABB=ON (102984-63-4/BI OR 12019-61-3/BI OR 12019-69-1/BI OR 12023-00-6/BI OR 12023-01-7/BI OR 12297-65-3/BI OR 12394-61-5/BI OR 12526-67-9/BI OR 12682-91-6/BI OR 146660-29-9/BI OR 252231-06-4/BI OR 260805-53-6/BI OR 55918-93-9/BI OR 62186-40-7/BI OR 67828-86-8/BI OR 70797-67-0/BI OR 70993-37-2/BI OR 7440-31-5/BI OR 7440-37-1/BI OR 7782-42-5/BI OR 83746-47-8/BI)
L3 1 SEA FILE=REGISTRY ABB=ON 7440-31-5

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L4            7 SEA FILE=REGISTRY ABB=ON  L2 AND CO/ELS AND SN/ELS
L6        20525 SEA FILE=REGISTRY ABB=ON  (LI(L)(MG OR B OR GA OR IN OR SB OR
                BI OR CD OR AG OR HF OR ZR OR Y))/ELS
L7        ~~5145~~ SEA FILE=REGISTRY ABB=ON  L6 AND AYS/CI   Li alloys
L9         6117 SEA FILE=HCAPLUS ABB=ON  L7
L12       95987 SEA FILE=HCAPLUS ABB=ON  L4 OR L3
L13        4435 SEA FILE=HCAPLUS ABB=ON  L12(L)(ANODE? OR ELECTRODE?)
L14         334 SEA FILE=HCAPLUS ABB=ON  L9(L)(ANODE? OR ELECTRODE?)
L15          21 SEA FILE=HCAPLUS ABB=ON  L13 AND L14
L16          18 SEA FILE=HCAPLUS ABB=ON  L15 AND BATTER?
L17      366379 SEA FILE=HCAPLUS ABB=ON  (SN OR TIN OR COSN2 OR COSN OR
                CO3SN2)
L18       29610 SEA FILE=HCAPLUS ABB=ON  L17(L)(ANODE? OR ELECTRODE?)
L20       38850 SEA FILE=HCAPLUS ABB=ON  (LI OR LITHIUM)(3A)(MG OR MAGNESIUM
                OR BORON OR B OR GA OR GALLIUM OR INDIUM OR SB OR ANTIMONY OR
                BI OR BISMUTH OR CD OR CADMIUM OR AG OR SILVER OR HF OR
                HAFNIUM OR ZR OR ZIRCONIUM OR YTTRIUM)
L21        3625 SEA FILE=HCAPLUS ABB=ON  L20(5A)ALLOY?
L22         132 SEA FILE=HCAPLUS ABB=ON  L18 AND L21
L23         113 SEA FILE=HCAPLUS ABB=ON  L22 AND BATTER?
L24          93 SEA FILE=HCAPLUS ABB=ON  L23 AND ELECTROCHEMICAL/SC
L25          58 SEA FILE=HCAPLUS ABB=ON  L21(L)DEV/RL
L26          10 SEA FILE=HCAPLUS ABB=ON  L24 AND L25
L27          13 SEA FILE=HCAPLUS ABB=ON  L23 AND PREP/RL
L31          11 SEA FILE=HCAPLUS ABB=ON  L27 AND L24
L32          19 SEA FILE=HCAPLUS ABB=ON  L26 OR L31
L33          17 SEA FILE=HCAPLUS ABB=ON  L15 AND ELECTROCHEMICAL/SC,SX
L34          36 SEA FILE=HCAPLUS ABB=ON  L16 OR L33 OR L32
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=> D L34 BIB ABS IND HITSTR 1-36

L34 ANSWER 1 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2006:584799 HCAPLUS
DN 145:86483
TI Method of preparing **Sn-Sb alloy** material for **lithium**-ion cell negative **electrode** by high-temperature carbon reduction
IN Zhao, Hailei; Yin, Chaoli; Wu, Hengliang; Qiu, Weihua
PA University of Science and Technology Beijing, Peop. Rep. China
SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 7 pp.
CODEN: CNXXEV
DT Patent
LA Chinese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CN 1688044	A	20051026	CN 2005-10011683	20050508
PRAI	CN 2005-10011683		20050508		

AB The title Sn-Sb alloy material is prepared by mixing SnO2 and Sb2O3 at an atom ratio of Sn/Sb=(3-1):(1-3) with stoichiometric carbon powder (active carbon or carbon black) according to chemical formula (1); heating in flowing nitrogen, or argon atmospheric at a rate of 5-30°/min to 700-1,100°, and holding for 1-5 h; and naturally cooling to room temperature
IC ICM H01M004-04
ICS H01M004-38; C22C001-00; C22C013-00; C22C012-00
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 56

ST **lithium** ion **battery anode antimony tin alloy** carbon redn

IT Reduction
(high temperature carbon; preparation of **antimony-tin alloy** for **lithium** ion **battery anodes** by)

IT **Battery anodes**
(lithium ion **battery**; preparation of antimony-**tin** alloy by high-temperature carbon reduction for)

IT 37233-35-5P 894357-40-5P
RL: DEV (Device component use); IMF (Industrial manufacture); **PREP (Preparation)**; USES (Uses)
(preparation of antimony-**tin** alloy for **battery anodes** by high-temperature carbon reduction)

IT 7440-44-0, Carbon, uses
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(preparation of antimony-**tin** alloy for **battery anodes** by high-temperature carbon reduction of)

IT 1309-64-4, Antimony oxide (Sb2O3), reactions 18282-10-5, **Tin** dioxide
RL: RCT (Reactant); RACT (Reactant or reagent)
(preparation of antimony-**tin** alloy for **battery anodes** by high-temperature carbon reduction of)

L34 ANSWER 2 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:1127459 HCAPLUS
DN 145:66104
TI Comparative studies of mechanical and electrochemical lithiation of intermetallic nanocomposite alloys for anode materials in Li-ion **batteries**
AU Roennebro, Ewa; Yin, Jingtian; Kitano, Akiko; Wada, Masahi; Sakai, Tetsuo
CS National Institute of Advanced Industrial Science and Technology (AIST) Kansai Center, 1-8-31 Midorigaoka, Ikeda, Osaka, 563-8577, Japan
SO Solid State Ionics (2005), 176(37-38), 2749-2757
CODEN: SSIOD3; ISSN: 0167-2738
PB Elsevier B.V.
DT Journal
LA English
AB Intermetallic composite compds., i.e. Ag52Sn48, Ag36.4Sb15.6Sn48 and Ag36.4Fe15.6Sn48, were lithiated by mech. grinding in order to compare with electrochem. lithiation of corresponding nanocomposite alloy with respect to lithium diffusion between active host materials. The structures were analyzed with synchrotron X-ray powder diffraction using the Rietveld method. The composite materials consist of Ag3Sn and Sn and in the case of adding Sb also SbSn. The alloys and the lithiated compds. have a strong crystallog. relation; the metal atoms form a more or less cubic closed-packed three-dimensional network with interstitial sites available for the Li atoms. Upon lithiation, the binary alloys form compds. with partial compns., i.e. Ag2-xLi1+xSn and Li2+xSn1-xSb. The similar lithium diffusion mechanisms for mech. and electrochem. lithiation and how it can be useful in designing new intermetallic composite alloys for Li-ion **batteries** were highlighted.
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49
ST intermetallic mech electrochem lithiation lithium **battery** anode
IT Lithiation
Nanocomposites

(comparative studies of mech. and electrochem. lithiation of intermetallic nanocomposite alloys for anode materials in Li-ion **batteries**)

IT Secondary **batteries**
(lithium, anodes; comparative studies of mech. and electrochem. lithiation of intermetallic nanocomposite alloys for anode materials in Li-ion **batteries**)

IT 7439-93-2, Lithium, uses
RL: DEV (Device component use); NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(comparative studies of mech. and electrochem. lithiation of intermetallic nanocomposite alloys for anode materials in Li-ion **batteries**)

IT **7440-31-5**, Tin, uses 12002-78-7 12041-38-2 28980-49-6 39285-19-3 67070-82-0 97037-11-1 529474-39-3 702645-12-3 **891787-78-3 891787-79-4 891787-80-7 891787-81-8**
RL: TEM (Technical or engineered material use); USES (Uses)
(comparative studies of mech. and electrochem. lithiation of intermetallic nanocomposite alloys for **anode** materials in Li-ion **batteries**)

IT **7440-31-5**, Tin, uses **891787-78-3 891787-79-4 891787-80-7 891787-81-8**
RL: TEM (Technical or engineered material use); USES (Uses)
(comparative studies of mech. and electrochem. lithiation of intermetallic nanocomposite alloys for **anode** materials in Li-ion **batteries**)

RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

RN 891787-78-3 HCAPLUS
CN Silver alloy, base, Ag 63,Sn 35,Li 2 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ag	63	7440-22-4
Sn	35	7440-31-5
Li	2	7439-93-2

RN 891787-79-4 HCAPLUS
CN Silver alloy, base, Ag 56,Sn 41,Li 3.6 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ag	56	7440-22-4
Sn	41	7440-31-5
Li	3.6	7439-93-2

RN 891787-80-7 HCAPLUS
CN Silver alloy, base, Ag 52,Sn 44,Li 4.4 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number

Ag	52	7440-22-4
Sn	44	7440-31-5
Li	4.4	7439-93-2

RN 891787-81-8 HCAPLUS
CN Antimony alloy, base, Sb 74,Sn 14,Li 12 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Sb	74	7440-36-0
Sn	14	7440-31-5
Li	12	7439-93-2

RE.CNT 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 3 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:445406 HCAPLUS
DN 142:484785
TI Preparation of electrically conductive composite powders for electrodes of **batteries**, fuel cells, and capacitors
IN Takeuchi, Tomonari; Tabuchi, Mitsuharu; Nakajima, Akiko; Kageyama, Hiroyuki; Nakamura, Tatsuya
PA National Institute of Advanced Industrial Science and Technology, Japan
SO Jpn. Kokai Tokkyo Koho, 27 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2005135723	A2	20050526	JP 2003-369835	20031030
PRAI	JP 2003-369835		20031030		

AB Claimed are powders of composites containing electrode active mass and 0.01-30 weight% of elec. conductors, wherein the active mass and the conductors are bonded at prescribed adhesion (definition of the adhesion is given as a test rest result). The powders are prepared by current-carrying sintering of mixts. of the active mass powder and elec. conductor powder enclosed in a conductive mold. Alternatively, the powder mixts. are coated with elec. conductors in stead of insertion into the mold in the current-carrying sintering. **Batteries**, fuel cells, and capacitors employing the composite powders show high output, high weight energy d., and high volume energy d.
IC ICM H01M004-58
ICS H01G009-058; H01M004-02; H01M004-04; H01M004-38; H01M004-62
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 76
ST electrode active mass composite elec conductor power; **battery** electrode active mass composite powder; fuel cell electrode active mass composite powder; capacitor electrode active mass composite powder
IT Electric conductors
(composite with conductor; preparation of powder of electrode active mass-conductor composite for **battery**, fuel cell, and capacitor)
IT Carbon black, uses
Carbonaceous materials (technological products)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)

(conductor, composite with conductor; preparation of powder of electrode active mass-conductor composite for **battery**, fuel cell, and capacitor)

IT Sintering
(in current-carrying; preparation of powder of electrode active mass-conductor composite for **battery**, fuel cell, and capacitor)

IT **Battery** electrodes
Capacitor electrodes
Capacitors
Composites
Fuel cell electrodes
Fuel cells
Primary **batteries**
Secondary **batteries**
(preparation of powder of electrode active mass-conductor composite for **battery**, fuel cell, and capacitor)

IT Aluminum alloy, base
Copper alloy, base
Iron alloy, base
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(conductor, composite with conductor; preparation of powder of electrode active mass-conductor composite for **battery**, fuel cell, and capacitor)

IT 15365-14-7P, Iron lithium phosphate (FeLiPO4) 113066-89-0P, Cobalt lithium nickel oxide (Co0.2LiNi0.8O2)
RL: DEV (Device component use); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PYP (Physical process); PREP (Preparation); PROC (Process); USES (Uses)
(active mass, composite with conductor; preparation of powder of electrode active mass-conductor composite for **battery**, fuel cell, and capacitor)

IT 11113-67-0, Iron lithium oxide 12057-17-9, Lithium manganese oxide (LiMn2O4) 12673-38-0, Iron lithium titanium oxide 39300-70-4, Lithium nickel oxide 39302-37-9, Lithium titanium oxide 52627-24-4, Cobalt lithium oxide 53027-29-5, Iron lithium manganese oxide 138758-08-4, Lithium manganese phosphorus oxide 177997-09-0, Cobalt lithium nickel phosphorus oxide 195881-00-6, Lithium nickel phosphorus oxide 204450-96-4, Chromium lithium manganese oxide 610316-49-9, Cobalt iron lithium phosphorus oxide 610316-50-2, Iron lithium nickel phosphorus oxide 852160-71-5, Iron lithium manganese phosphorus oxide 852160-72-6, Cobalt lithium phosphorus oxide 852160-73-7 852160-74-8
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(active mass, composite with conductor; preparation of powder of electrode active mass-conductor composite for **battery**, fuel cell, and capacitor)

IT 12033-89-5, Silicon nitride (Si3N4), uses
RL: TEM (Technical or engineered material use); USES (Uses)
(component in current-carrying sintering mold; in preparation of powder of electrode active mass-conductor composite for **battery**, fuel cell, and capacitor)

IT 7429-90-5, Aluminum, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(conductor and active mass, composite with conductor; preparation of powder of electrode active mass-conductor composite for **battery**, fuel cell, and capacitor)

IT 1332-29-2, Tin oxide 1332-37-2, Iron oxide, uses 7439-89-6, Iron, uses

7439-92-1, Lead, uses 7439-93-2, Lithium, uses 7440-21-3, Silicon, uses **7440-31-5**, Tin, uses 7440-36-0, Antimony, uses 7440-44-0, Carbon, uses 7440-50-8, Copper, uses 7440-56-4, Germanium, uses 7440-74-6, Indium, uses 11124-13-3, Indium, tin 12798-95-7, Aluminum, lithium 26134-62-3, Lithium nitride 50926-11-9, Indium tin oxide **53740-64-0**, Indium, lithium
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(conductor, composite with conductor; preparation of powder of **electrode** active mass-conductor composite for **battery**, fuel cell, and capacitor)

IT 7782-42-5, Graphite, uses 12070-12-1, Tungsten carbide (WC)
RL: TEM (Technical or engineered material use); USES (Uses)
(current-carrying sintering mold; in preparation of powder of electrode active mass-conductor composite for **battery**, fuel cell, and capacitor)

IT **7440-31-5**, Tin, uses **53740-64-0**, Indium, lithium
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(conductor, composite with conductor; preparation of powder of **electrode** active mass-conductor composite for **battery**, fuel cell, and capacitor)

RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

RN 53740-64-0 HCAPLUS
CN Indium alloy, nonbase, In,Li (9CI) (CA INDEX NAME)

Component	Component Registry Number
In	7440-74-6
Li	7439-93-2

L34 ANSWER 4 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:961663 HCAPLUS
DN 142:117529
TI Electrochemical Reactivity of Mg2Sn Phases with Metallic Lithium
AU Larcher, Dominique; Prakash, A. S.; Saint, Juliette; Morcrette, Mathieu; Tarascon, Jean-Marie
CS Laboratoire de Reactivite et Chimie des Solides, CNRS UMR 6007, Universite de Picardie Jules Verne, Amiens, 80039, Fr.
SO Chemistry of Materials (2004), 16(25), 5502-5511
CODEN: CMATEX; ISSN: 0897-4756
PB American Chemical Society
DT Journal
LA English
AB Stable (c) and metastable (h) forms of Mg2Sn were prepared as crystallized phases by ball-milling of elemental powders. Through in situ XRD the reactivity mechanisms of c-Mg2Sn toward Li were deduced. It entails 1st a monophasic insertion of about one Li per formula unit into the face centered cubic Sn framework without extrusion of either Mg or Sn, then a biphasic process giving cubic Li2MgSn with progressive expulsion of Mg, and finally the formation of

Li-Mg solid-solution **alloys**. Upon charging, the poor reversibility of the **alloying** reaction of **Li** with **Mg** leads to a deficit in free Mg, giving a Mg2Sn + Sn mixture which accounts for the poor cyclability of Mg2Sn/Li cells in the 0.0-1.5 V window. Limiting the cycling to the monophasic process was shown to improve cycling behavior. Finally, the electrochem. reaction of h-Mg2Sn with Li leads to the same Li2MgSn intermediate and the same sequence of transformations, resulting in similarly poor capacity retention upon cycling.

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 72

ST magnesium **tin** phase **anode** electrochem reactivity lithium **battery**

IT **Battery** anodes
Electrode reaction
(electrochem. reactivity of Mg2Sn anode material for lithium **batteries** with metallic lithium)

IT **7440-31-5**, **Tin**, uses
RL: RCT (Reactant); TEM (Technical or engineered material use); RACT (Reactant or reagent); USES (Uses)
(ball-milled with magnesium; electrochem. reactivity of Mg2Sn **anode** material for lithium **batteries** with metallic lithium)

IT 7439-95-4, Magnesium, uses
RL: RCT (Reactant); TEM (Technical or engineered material use); RACT (Reactant or reagent); USES (Uses)
(ball-milled with **tin**; electrochem. reactivity of Mg2Sn **anode** material for lithium **batteries** with metallic lithium)

IT 1313-08-2P 37274-42-3P
RL: PNU (Preparation, unclassified); RCT (Reactant); TEM (Technical or engineered material use); **PREP (Preparation)**; RACT (Reactant or reagent); USES (Uses)
(electrochem. reactivity of Mg2Sn anode material for lithium **batteries** with metallic lithium)

IT 121922-28-9P **195967-34-1P**
RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)
(electrochem. reactivity of Mg2Sn **anode** material for lithium **batteries** with metallic lithium)

IT 7439-93-2, Lithium, uses
RL: RCT (Reactant); TEM (Technical or engineered material use); RACT (Reactant or reagent); USES (Uses)
(electrochem. reactivity of Mg2Sn anode material for lithium **batteries** with metallic lithium)

IT **7440-31-5**, **Tin**, uses
RL: RCT (Reactant); TEM (Technical or engineered material use); RACT (Reactant or reagent); USES (Uses)
(ball-milled with magnesium; electrochem. reactivity of Mg2Sn **anode** material for lithium **batteries** with metallic lithium)

RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

IT **195967-34-1P**

RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)
(electrochem. reactivity of Mg2Sn **anode** material for lithium **batteries** with metallic lithium)
RN 195967-34-1 HCAPLUS
CN Tin alloy, base, Sn 76,Mg 15,Li 8.8 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Sn	76	7440-31-5
Mg	15	7439-95-4
Li	8.8	7439-93-2

RE.CNT 39 THERE ARE 39 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 5 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:715896 HCAPLUS
DN 142:338913
TI Evaluation of alloys synthesized by mechanical alloying as potential anode materials for lithium-ion **batteries**
AU Wachtler, Mario; Schiffini, Liliana; Amadei, Ilaria; Moreno, Judith Serra; Scrosati, Bruno; Cocco, Giorgio
CS Department of Chemistry, University of Rome "La Sapienza", Rome, IT-00185, Italy
SO Journal of Metastable and Nanocrystalline Materials (2004), 20-21, 263-268
CODEN: JMNMBF; ISSN: 1422-6375
PB Trans Tech Publications Ltd.
DT Journal
LA English
AB Several alloys (Mg2Si, Li4Mg2Si, Sn0.66Sb0.34, and Li4Sn0.72Sb0.28) have been synthesized by mech. alloying and characterized for their performance as anode materials for Li-ion **batteries.** Sn0.66Sb0.34 shows a better cycling performance than Mg2Si, whose higher initial capacities fade after a few cycles only. The pre-lithiated materials Li4Mg2Si and Li4Sn0.72Sb0.28 give good cycling stabilities, however, at much smaller capacities than exhibited by their unlithiated counterparts.
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 56
ST mech alloying alloy **anode** material lithium ion **battery** ; **battery anode antimony lithium magnesium** silicon **tin alloy**
IT **Battery** anodes
Mechanical alloying
(evaluation of alloys synthesized by mech. alloying as potential anode materials for lithium-ion **batteries**)
IT Secondary **batteries**
(lithium; evaluation of alloys synthesized by mech. alloying as potential anode materials for lithium-ion **batteries**)
IT Electric capacitance
X-ray diffraction
(of alloys synthesized by mech. alloying as potential anode materials for lithium-ion **batteries**)
IT 22831-39-6P, Magnesium silicide (Mg2Si) 848591-00-4P 848591-01-5P 848591-02-6P
RL: PNU (Preparation, unclassified); PRP (Properties); **PREP (Preparation)**
(evaluation of alloys synthesized by mech. alloying as potential anode

materials for lithium-ion **batteries**)
RE.CNT 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 6 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:338910 HCAPLUS
DN 141:245953
TI Optimized Sn/SnSb lithium storage materials
AU Mukaibo, H.; Osaka, T.; Reale, P.; Panero, S.; Scrosati, B.; Wachtler, M.
CS Waseda University, Tokyo, Japan
SO Journal of Power Sources (2004), 132(1-2), 225-228
CODEN: JPSODZ; ISSN: 0378-7753
PB Elsevier Science B.V.
DT Journal
LA English
AB The authors report the synthesis of SnSb-based intermetallic with improved morphol. The electrochem. characterization shows that these materials have a good electrode behavior in a lithium cell. Capacities exceeding 800 mAh/g with a charge-discharge efficiency approaching 100%, were obtained. The percent of the initial irreversible capacity is moderate. The capacity decreases upon cycling quite likely due to a still not optimized electrode structure.
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 56, 72, 76
ST secondary **lithium battery anode tin antimony** intermetallic **alloy** capacity
IT Intermetallic compounds
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(**anodes**; optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)
IT Electric energy
(capacity of assembled **battery** during charge/discharge cycling; optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)
IT Lithiation
(cycling; optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)
IT Carbon black, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(in composite **anode** with SnSb/PVDF; optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)
IT Secondary **batteries**
(lithium; optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)
IT Electric potential
(of assembled **battery** during charge/discharge cycling; optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)
IT Electric impedance
(of composite **anode**; optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)
IT **Battery anodes**
(optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)
IT Fluoropolymers, uses

RL: DEV (Device component use); USES (Uses)
(optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)

IT 24937-79-9, PVDF
RL: DEV (Device component use); USES (Uses)
(**anode** binder for SnSb/carbon composite; optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)

IT 7439-93-2, Lithium, uses
RL: DEV (Device component use); USES (Uses)
(**anode**; optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)

IT 21651-19-4, **Tin** oxide (SnO)
RL: DEV (Device component use); FMU (Formation, unclassified); FORM (Formation, nonpreparative); USES (Uses)
(formed during annealing; optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)

IT 176520-10-8P
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); SPN (Synthetic preparation); **PREP (Preparation)**; PROC (Process); USES (Uses)
(in composite **anode** with carbon and PVDF; optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 7791-03-9, Lithium perchlorate
RL: DEV (Device component use); USES (Uses)
(optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)

IT 7440-31-5P, **Tin**, uses 28980-49-6P
RL: DEV (Device component use); SPN (Synthetic preparation); **PREP (Preparation)**; USES (Uses)
(phase present in **anode** alloy; optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)

IT 7440-50-8, Copper, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(substrate; optimized **Sn**/SnSb lithium storage materials for use in secondary **battery anodes**)

RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 7 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:211312 HCAPLUS
DN 141:126201
TI Lithium storage alloys and metal/carbon composites as anodes for lithium ion **batteries**
AU Yang, Jun; Takeda, Yasuo; Imanishi, Nobuyuki; Yamamoto, Osamu
CS Department of Chemistry, Faculty of Engineering, Mie University, Kamihamacho, Tsu, Mie, 514-8507, Japan
SO Recent Research Developments in Solid State Ionics (2003), 1, 1-15
CODEN: RRDSC5
PB Transworld Research Network
DT Journal
LA English
AB Lithium alloys as anode materials for lithium ion **batteries** can provide a higher reversible capacity than graphite and the related carbonaceous materials. However, insertion of lithium into (or its extraction from) metallic hosts involves the drastic volume change, leading to the

rapid mech. disintegration and capacity loss during cycling. The cyclability of the lithium alloy electrodes was improved by designing the morphol. and the microstructure of lithium storage materials. Decreasing the grain (or particle) size and choosing multiphase alloy hosts was an effective way to maintain the cycling stability. In particular, the use of metal/carbon composites suppressed the volume change effect and greatly enhanced the cycle life performance.

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49, 56, 72, 76

ST lithium storage alloy metal carbon composite **anode** secondary **battery**; insertion reaction **lithium** ion **tin** **antimony silver alloy** oxide

IT Fluoropolymers, uses
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(binder; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)

IT Electric energy
(discharge capacity vs. voltage for electrodes and assembled **batteries**; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)

IT **Battery** anodes
Composites
Insertion reaction
Particle size
(electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)

IT Alloys, uses
RL: DEV (Device component use); SPN (Synthetic preparation); **PREP (Preparation)**; USES (Uses)
(electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)

IT Carbon black, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)

IT Secondary **batteries**
(lithium; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)

IT Microstructure
(of composite electrodes; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)

IT Electric potential
(of lithium insertion into **tin**, alloys, and oxides using various binders; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as **anodes** for lithium ion **batteries**)

IT Electric impedance
(of various composite electrodes; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)

IT 9002-93-1, Triton X-114

RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(Celgard wetting agent; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)

IT 9002-88-4, Polyethylene 24937-79-9, PVDF
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(binder; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)

IT 7782-42-5, NG-7, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(composites with **tin**, support; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as **anodes** for lithium ion **batteries**
)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 7440-02-0, Nickel, uses 7791-03-9, Lithium perchlorate (LiClO4)
RL: DEV (Device component use); USES (Uses)
(electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)

IT 7440-31-5P, **Tin**, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); SPN (Synthetic preparation); **PREP (Preparation)**; PROC (Process); USES (Uses)
(electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as **anodes** for lithium ion **batteries**)

IT 21651-19-4P, **Tin** oxide (SnO) 229314-75-4P
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); **PREP (Preparation)**; USES (Uses)
(electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as **anodes** for lithium ion **batteries**)

IT 12732-50-2P
RL: DEV (Device component use); SPN (Synthetic preparation); **PREP (Preparation)**; USES (Uses)
(electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)

IT 7439-93-2, Lithium, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)

IT 174421-80-8, Cobalt lithium nitride (Co0.4Li2.6N)
RL: DEV (Device component use); USES (Uses)
(electrode additive; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)

IT 12597-68-1, Stainless steel, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(electrode current collector and support; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion

batteries)
IT 12057-24-8, Lithium oxide (Li2O), uses
RL: DEV (Device component use); FMU (Formation, unclassified); FORM (Formation, nonpreparative); USES (Uses)
(formed during lithium insertion into SnO; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)
IT 7440-44-0, Carbon, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(mesophase spherules, composites with **tin**, support; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as **anodes** for lithium ion **batteries**)
IT 12041-38-2, Silver, compound with **tin** (3:1) 68785-73-9, Silver, compound with **tin** (4:1)
RL: DEV (Device component use); OCU (Occurrence, unclassified); OCCU (Occurrence); USES (Uses)
(phase in AgxSn; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as **anodes** for lithium ion **batteries**)
IT 28980-49-6, Antimony, compound with **tin** (1:1)
RL: DEV (Device component use); OCU (Occurrence, unclassified); OCCU (Occurrence); USES (Uses)
(phase in **tin**-antimony alloys; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as **anodes** for lithium ion **batteries**
)
IT 9003-07-0, Celgard 2402
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(separator; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)
IT 7440-50-8, Copper, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(substrates; electrochem. cycling, voltage, and discharge capacity of lithium storage alloys and metal/carbon composites used as anodes for lithium ion **batteries**)
RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 8 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:210614 HCAPLUS
DN 141:9524
TI Nanocrystalline Ag-Fe-**Sn** **Anode** Materials for Li-Ion **Batteries**
AU Yin, Jingtian; Wada, Masashi; Tanase, Shigeo; Sakai, Tetsuo
CS National Institute of Advanced Industrial Science and Technology, Ikeda, Osaka, 563-8577, Japan
SO Journal of the Electrochemical Society (2004), 151(4), A583-A589
CODEN: JESOAN; ISSN: 0013-4651
PB Electrochemical Society
DT Journal
LA English
AB The Ag-Fe-**Sn** alloy powders prepared by mech. alloying technique were studied as **anode** material for lithium-ion **batteries**. The half-cell tests with lithium counter **electrode** revealed

that a suitable substitution of Fe for Ag led to a significant improvement of the cycling performance of the **electrodes.** Among these **electrodes**, the Ag36.4Fe15.6Sn48 **electrode** is capable of keeping a rechargeable capacity of .apprx.280 mAh/g over 300 cycles, which was better than that of the Fe-free Ag52Sn48 **electrode.** Typically, the structural changes of the Ag26Fe26Sn48 **electrode** during Li insertion and/or extraction were characterized using the combined techniques involving x-ray diffraction, high resolution TEM, selected area electron diffraction, and energy dispersive x-ray spectrometry. Probably the electrochem. properties of these **electrodes** are associated with their microstructure and morphol., such as the distribution of intermetallic compound Ag3Sn in **Sn** matrix, the Ag3Sn/**Sn** ratio as well as the presence of inactive Fe.

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 55, 56, 72, 76

ST nanocryst silver iron **tin** alloy secondary **battery** **anode** capacitance

IT Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(PVDF, composite **anodes** with alloys and carbon black; nanocryst. Ag-Fe-**Sn** mech. alloyed **anode** materials for Li-ion **batteries**)

IT Carbon black, uses
RL: DEV (Device component use); USES (Uses)
(composite **anodes** with alloys and PVDF; nanocryst. Ag-Fe-**Sn** mech. alloyed **anode** materials for Li-ion **batteries**)

IT Alloys, uses
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); **PREP (Preparation)**; USES (Uses)
(composite **anodes** with carbon black and PVDF; nanocryst. Ag-Fe-**Sn** mech. alloyed **anode** materials for Li-ion **batteries**)

IT Insertion reaction
(lithium into **electrode** alloy; nanocryst. Ag-Fe-**Sn** mech. alloyed **anode** materials for Li-ion **batteries**)

IT Secondary **batteries**
(**lithium**; nanocryst. **Ag**-Fe-**Sn** mech. **alloyed anode** materials for Li-ion **batteries**)

IT **Battery anodes**
Mechanical alloying
Nanocrystalline materials
(nanocryst. Ag-Fe-**Sn** mech. alloyed **anode** materials for Li-ion **batteries**)

IT Electric capacitance
(of alloy composite **electrodes**, dependence on iron content; nanocryst. Ag-Fe-**Sn** mech. alloyed **anode** materials for Li-ion **batteries**)

IT 24937-79-9, Polyvinylidene fluoride
RL: DEV (Device component use); USES (Uses)
(PVDF, composite **anodes** with alloys and carbon black; nanocryst. Ag-Fe-**Sn** mech. alloyed **anode** materials for Li-ion **batteries**)

IT 7440-50-8, Copper, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(foil in **anode**; nanocryst. Ag-Fe-**Sn** mech. alloyed **anode** materials for Li-ion **batteries**)

IT 96-49-1, Ethylene carbonate 616-38-6, Dimethyl carbonate 21324-40-3, **Lithium** hexafluorophosphate (LiPF6)
RL: **DEV (Device component use)**; USES (Uses)
(nanocryst. **Ag-Fe-Sn** mech. **alloyed anode** materials for Li-ion **batteries**)

IT 7439-93-2, **Lithium**, uses
RL: **DEV (Device component use)**; TEM (Technical or engineered material use); USES (Uses)
(nanocryst. **Ag-Fe-Sn** mech. **alloyed anode** materials for Li-ion **batteries**)

IT 57-11-4, Stearic acid, uses
RL: MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(nanocryst. Ag-Fe-**Sn** mech. alloyed **anode** materials for Li-ion **batteries**)

IT 7439-89-6, Iron, reactions
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(nanocryst. Ag-Fe-**Sn** mech. alloyed **anode** materials for Li-ion **batteries**)

IT 7440-22-4, Silver, reactions 7440-31-5, **Tin**, reactions
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(nanocryst. Ag-Fe-**Sn** mech. alloyed **anode** materials for Li-ion **batteries**)

IT 39285-19-3P 529474-38-2P 529474-39-3P 529474-40-6P 529474-42-8P 529474-44-0P 529474-47-3P 696645-02-0P
RL: PRP (Properties); SPN (Synthetic preparation); **PREP (Preparation)**
(nanocryst. Ag-Fe-**Sn** mech. alloyed **anode** materials for Li-ion **batteries**)

IT 12041-04-2 12249-80-8
RL: FMU (Formation, unclassified); PRP (Properties); FORM (Formation, nonpreparative)
(phase formed during lithiation of Ag26Fe26Sn48-based **anode**; nanocryst. Ag-Fe-**Sn** mech. alloyed **anode** materials for Li-ion **batteries**)

IT 12041-38-2
RL: FMU (Formation, unclassified); PRP (Properties); FORM (Formation, nonpreparative)
(phase formed in alloys; nanocryst. Ag-Fe-**Sn** mech. alloyed **anode** materials for Li-ion **batteries**)

RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 9 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2003:389061 HCAPLUS
DN 139:135990
TI Sn and SnBi foil as anode materials for secondary lithium **battery**
AU Yang, Shoufeng; Zavalij, Peter Y.; Whittingham, M. Stanley
CS Institute for Materials Research, SUNY-Binghamton University, Binghamton, NY, 13902, USA
SO Materials Research Society Symposium Proceedings (2003), 756(Solid State Ionics--2002), 295-300
CODEN: MRSPDH; ISSN: 0272-9172
PB Materials Research Society
DT Journal
LA English
AB A study of the cycling mechanism of metal alloy anodes and the capacity

fade of Li **batteries** are presented. Sn foil and Sn-Bi mixts. were chosen because conductive diluents or binders are not needed and the intrinsic behavior can be observed A pure Sn foil was found to react rapidly with Li, ≥3 mA/cm2, and with no capacity fade for >10 cycles. This is better than Sn powder or electrodeposited Sn. After the 1st cycle, the foil reacts with Li following a stepwise formation of different alloys as dictated by thermodn. Incorporation of Bi into the foil increased the capacity fade after the 1st few cycles. The eutectic composition Sn0.57Bi0.43 had better capacity retention than Sn0.5Bi0.5. XRD and SEM-EDS show that Bi is rejected from the Sn rich phase during Li insertion and is not reincorporated on Li removal, as expected from the phase diagram.

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 56

ST bismuth tin foil anode lithium **battery**

IT **Battery** anodes
(Sn and BiSn foils as anodes for secondary lithium **batteries**)

IT Secondary **batteries**
(lithium; Sn and BiSn foils as anodes for secondary lithium **batteries**)

IT **7440-31-5**, Tin, uses 12735-94-3, Bismuth 50 tin 50 (atomic) 39381-50-5, Bismuth 57 tin 43 (atomic)
RL: DEV (Device component use); USES (Uses)
(Sn and BiSn foils as **anodes** for secondary lithium **batteries**)

IT 51613-60-6 101898-82-2 244162-22-9 244162-24-1 566933-34-4 566933-35-5 566933-36-6 **566933-37-7 566933-38-8 566933-39-9 566933-40-2 566933-42-4**
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(Sn and SnBi foils as **anodes** for secondary lithium **batteries** with)

IT **7440-31-5**, Tin, uses
RL: DEV (Device component use); USES (Uses)
(Sn and BiSn foils as **anodes** for secondary lithium **batteries**)

RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

IT **566933-37-7 566933-38-8 566933-39-9 566933-40-2 566933-42-4**
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(Sn and SnBi foils as **anodes** for secondary lithium **batteries** with)

RN 566933-37-7 HCAPLUS
CN Bismuth alloy, base, Bi 60,Sn 34,Li 6 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Bi	60	7440-69-9
Sn	34	7440-31-5
Li	6	7439-93-2

RN 566933-38-8 HCAPLUS
CN Bismuth alloy, base, Bi 59,Sn 33,Li 7.8 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Bi	59	7440-69-9
Sn	33	7440-31-5
Li	7.8	7439-93-2

RN 566933-39-9 HCAPLUS
CN Bismuth alloy, base, Bi 58,Sn 33,Li 9.6 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Bi	58	7440-69-9
Sn	33	7440-31-5
Li	9.6	7439-93-2

RN 566933-40-2 HCAPLUS
CN Bismuth alloy, base, Bi 56,Sn 32,Li 13 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Bi	56	7440-69-9
Sn	32	7440-31-5
Li	13	7439-93-2

RN 566933-42-4 HCAPLUS
CN Bismuth alloy, base, Bi 64,Sn 36,Li 0.4 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Bi	64	7440-69-9
Sn	36	7440-31-5
Li	0.4	7439-93-2

RE.CNT 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 10 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2003:317682 HCAPLUS
DN 138:324054
TI Graphite anode containing metal and oxide, its manufacture, and secondary **battery** using it
IN Mori, Mitsuhiro; Utsuki, Koji; Yamamoto, Hiroki; Iriyama, Jiro; Miura, Tamaki; Miyaji, Mariko
PA NEC Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 11 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003123740	A2	20030425	JP 2001-320871	20011018
PRAI	JP 2001-320871		20011018		

AB The claimed anode is equipped with an active mass layer containing (a) Li ion-intercalating carbon particles, (b) metal particles alloyable with Li, and (c) Li ion-intercalating oxide particles. An also claimed anode is

equipped with an active mass layer containing particles having Li releasing potential vs. Li standard potential (A) <0.3 V, (B) ≥0.3 V and <0.6 V, and (C) ≥0.6 V. The anode is manufactured by preparing an active mass paste containing a binder and a solvent, coating it on a current collector, and then drying. The resulting **battery** is prevented from dendrite growth and powderization for long time and provides high energy d. and long cycle life.

IC ICM H01M004-02
ICS H01M004-38; H01M004-48; H01M004-58; H01M010-40

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)

ST lithium ion intercalating graphite anode alloy oxide **battery**

IT **Battery** anodes
(lithium-intercalating graphite anode containing lithium-alloying metal and oxide for secondary **battery**)

IT Secondary **batteries**
(lithium; lithium-intercalating graphite anode containing lithium-alloying metal and oxide for secondary **battery**)

IT 1303-86-2, Boria, uses 1312-43-2, **Indium** oxide 1314-13-2, Zinc oxide, uses 1314-56-3, Phosphorus pentoxide, uses 1332-29-2, **Tin** oxide 1344-28-1, Alumina, uses 7429-90-5, Aluminum, uses 7440-21-3, Silicon, uses 7440-31-5, **Tin**, uses 7440-66-6, Zinc, uses 7440-74-6, **Indium**, uses 7631-86-9D, Silicon oxide, nonstoichiometric 7782-42-5, Graphite, uses 12057-24-8, Lithium oxide, uses
RL: **DEV (Device component use)**; USES (Uses)
(**lithium**-intercalating graphite **anode** containing lithium-**alloying** metal and oxide for secondary **battery**)

L34 ANSWER 11 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2002:716677 HCAPLUS
DN 137:235267
TI Secondary light metal **battery**
IN Fujita, Shigeru; Akashi, Hiroyuki; Adachi, Momoe; Shibamoto, Gorou
PA Sony Corporation, Japan
SO PCT Int. Appl., 42 pp.
CODEN: PIXXD2
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002073731	A1	20020919	WO 2002-JP2409	20020314
	W: US				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR				
	JP 2002270231	A2	20020920	JP 2001-73058	20010314
	EP 1369951	A1	20031210	EP 2002-705176	20020314
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR				
	US 2004096736	A1	20040520	US 2003-471988	20030912
PRAI	JP 2001-73058	A	20010314		
	WO 2002-JP2409	W	20020314		

AB The **battery** has an anode, whose capacity is the sum of the intercalation and deposition capacities of a light metal M of the anode active mass, and an electrolyte containing ≥1 of (CmF2m+1SO2)(CnF2n+1SO2)NM (m and n are integers ≥1) and ≥1 other M salts. The anion of other M salt is selected from PF6-, AsF6-, BF4-, and ClO4-; and the anode contains carbonaceous materials and/or

metal, semiconductor, and alloy capable of alloying with M. M is preferably Li.

IC ICM H01M010-40
ICS H01M004-58; H01M004-38; H01M004-02

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)

ST secondary lithium **battery** carbonaceous material metal anode; perfluoroalkylsulfonimide salt inorg salt mixt lithium **battery** electrolyte

IT **Battery** anodes
(Li intercalating and alloying anodes in secondary lithium **batteries** with Li perfluoroalkylsulfonimide salt based electrolytes)

IT **Battery** electrolytes
(compns. of Li perfluoroalkylsulfonimide salt based electrolyte mixts. for secondary lithium **batteries**)

IT Secondary **batteries**
(lithium; secondary lithium **batteries** with lithium perfluoroalkylsulfonimide salt based electrolyte mixts. and Li intercalating and alloying anodes)

IT 7429-90-5, Aluminum, uses 7439-92-1, Lead, uses 7439-95-4, **Magnesium**, uses 7440-21-3, Silicon, uses 7440-22-4, **Silver**, uses 7440-31-5, **Tin**, uses 7440-36-0, **Antimony**, uses 7440-38-2, Arsenic, uses 7440-42-8, **Boron**, uses 7440-43-9, **Cadmium**, uses 7440-55-3, **Gallium**, uses 7440-56-4, Germanium, uses 7440-58-6, **Hafnium**, uses 7440-66-6, Zinc, uses 7440-67-7, **Zirconium**, uses 7440-69-9, **Bismuth**, uses 7440-74-6, **Indium**, uses
RL: **DEV (Device component use)**; USES (Uses)
(**Li** intercalating and **alloying anodes** in secondary lithium **batteries** with Li perfluoroalkylsulfonimide salt based electrolytes)

IT 7782-42-5, Graphite, uses
RL: DEV (Device component use); USES (Uses)
(Li intercalating and alloying anodes in secondary lithium **batteries** with lithium perfluoroalkylsulfonimide salt based electrolytes)

IT 96-49-1, Ethylene carbonate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 7791-03-9, Lithium perchlorate 14283-07-9, Lithium fluoroborate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 90076-65-6 132843-44-8
RL: DEV (Device component use); USES (Uses)
(compns. of Li perfluoroalkylsulfonimide salt based electrolyte mixts. for secondary lithium **batteries**)

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 12 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2002:595194 HCAPLUS
DN 137:143060
TI Fabrication of a lithium electrode comprising surface-treated lithium particles for lithium **battery**
IN Cho, Byung-Won; Cho, Won-Il; Kim, Hyung-Sun; Kim, Un-Sek; Nam, Sang-Cheol; Lim, Young-Chang
PA Korea Institute of Science and Technology, S. Korea
SO PCT Int. Appl., 19 pp.
CODEN: PIXXD2
DT Patent
LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002061864	A1	20020808	WO 2001-KR134	20010131
	W: JP, KR, US				
PRAI	WO 2001-KR134		20010131		

AB The present invention relates to a lithium electrode comprising surface-treated lithium or lithium alloy particles, its fabrication and lithium **battery** comprising the same. More specifically, the present invention relates to a lithium electrode comprising lithium particles or lithium particles coated with metal or metal oxide.

IC ICM H01M004-38

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 56

ST **battery** anode surface treated lithium particle

IT Vapor deposition process
(chemical; fabrication of lithium electrode comprising surface-treated lithium particles for lithium **battery**)

IT Oxides (inorganic), uses
RL: TEM (Technical or engineered material use); USES (Uses)
(coating; fabrication of lithium electrode comprising surface-treated lithium particles for lithium **battery**)

IT Electron beams
Ion beams
Laser ablation
Sputtering
(deposition by; fabrication of lithium electrode comprising surface-treated lithium particles for lithium **battery**)

IT Coating process
(electroless; fabrication of lithium electrode comprising surface-treated lithium particles for lithium **battery**)

IT **Battery** anodes
Electrodeposition
Surface treatment
(fabrication of lithium electrode comprising surface-treated lithium particles for lithium **battery**)

IT Fluoropolymers, uses
RL: MOA (Modifier or additive use); USES (Uses)
(fabrication of lithium electrode comprising surface-treated lithium particles for lithium **battery**)

IT Alloys, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fabrication of lithium electrode comprising surface-treated lithium particles for lithium **battery**)

IT Primary **batteries**
Secondary **batteries**
(lithium; fabrication of lithium electrode comprising surface-treated lithium particles for lithium **battery**)

IT Vapor deposition process
(phys.; fabrication of lithium electrode comprising surface-treated lithium particles for lithium **battery**)

IT 7429-90-5, Aluminum, uses 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses 7440-22-4, Silver, uses **7440-31-5**, Tin, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses

RL: TEM (Technical or engineered material use); USES (Uses)
(coating; fabrication of lithium **electrode** comprising surface-treated lithium particles for lithium **battery**)

IT 1313-13-9, Manganese dioxide, uses 1314-62-1, Vanadium pentoxide, uses 12031-65-1, Lithium nickel oxide linio2 12037-42-2, Vanadium oxide v6o13 12057-17-9, Lithium manganese oxide limn2o4 162004-08-2, Cobalt lithium nickel oxide colinio2
RL: DEV (Device component use); USES (Uses)
(fabrication of lithium electrode comprising surface-treated lithium particles for lithium **battery**)

IT 24937-79-9, Pvdf
RL: MOA (Modifier or additive use); USES (Uses)
(fabrication of lithium electrode comprising surface-treated lithium particles for lithium **battery**)

IT 71849-43-9 **71849-44-0 72256-16-7** 72785-69-4 75418-59-6 **97838-42-1**
RL: TEM (Technical or engineered material use); USES (Uses)
(fabrication of lithium **electrode** comprising surface-treated lithium particles for lithium **battery**)

IT **7440-31-5**, Tin, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(coating; fabrication of lithium **electrode** comprising surface-treated lithium particles for lithium **battery**)

RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

IT **71849-44-0 72256-16-7 97838-42-1**
RL: TEM (Technical or engineered material use); USES (Uses)
(fabrication of lithium **electrode** comprising surface-treated lithium particles for lithium **battery**)

RN 71849-44-0 HCAPLUS
CN Lithium alloy, base, Li,Sb (9CI) (CA INDEX NAME)

Component	Component Registry Number
Li	7439-93-2
Sb	7440-36-0

RN 72256-16-7 HCAPLUS
CN Lithium alloy, base, Li,B (9CI) (CA INDEX NAME)

Component	Component Registry Number
Li	7439-93-2
B	7440-42-8

RN 97838-42-1 HCAPLUS
CN Lithium alloy, base, Li,Bi (9CI) (CA INDEX NAME)

Component	Component Registry Number
Li	7439-93-2
Bi	7440-69-9

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 13 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2002:595193 HCAPLUS
DN 137:143059
TI Fabrication of a lithium electrode dispersed in porous 3-dimensional current collector for lithium **battery**
IN Cho, Byung-Won; Cho, Won-Il; Kim, Hyung-Sun; Kim, Un-Sek; Nam, Sang-Cheol
PA Korea Institute of Science and Technology, S. Korea
SO PCT Int. Appl., 20 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2002061863	A1	20020808	WO 2001-KR132	20010131
W: JP, KR, US				
PRAI WO 2001-KR132		20010131		

AB The present invention relates to a lithium electrode, its fabrication method, and lithium **battery** comprising the same, wherein the lithium electrode comprises lithium or lithium alloy dispersed in a porous 3-dimensional current collector.
IC ICM H01M004-38
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST **battery** lithium anode dispersion porous three dimensional current collector
IT Electric arc
Electron beams
Ion beams
Laser ablation
Sputtering
(deposition by; fabrication of lithium electrode dispersed in porous three-dimensional current collector for lithium **battery**)
IT **Battery** anodes
Electrodeposition
(fabrication of lithium electrode dispersed in porous three-dimensional current collector for lithium **battery**)
IT Primary **batteries**
Secondary **batteries**
(lithium; fabrication of lithium electrode dispersed in porous three-dimensional current collector for lithium **battery**)
IT Lithium alloy, base
RL: DEV (Device component use); USES (Uses)
(fabrication of lithium electrode dispersed in porous three-dimensional current collector for lithium **battery**)
IT 7429-90-5, Aluminum, uses 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses **7440-31-5**, Tin, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-36-0, Antimony, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 12798-95-7 **37218-62-5** 53680-59-4 **65777-94-8** 68848-64-6 **71849-44-0**
RL: DEV (Device component use); USES (Uses)

(current collector; fabrication of lithium **electrode** dispersed in porous three-dimensional current collector for lithium **battery**)

IT 1313-13-9, Manganese dioxide, uses 1314-62-1, Vanadium pentoxide, uses 7439-93-2, Lithium, uses 7719-09-7, Thionyl chloride 12031-65-1, Lithium nickel oxide linio2 12037-42-2, Vanadium oxide v6o13 12057-17-9, Lithium manganese oxide limn2o4 12190-79-3, Cobalt lithium oxide colio2 51311-17-2, Carbon fluoride 162004-08-2, Cobalt lithium nickel oxide colinio2
RL: DEV (Device component use); USES (Uses)
(fabrication of lithium electrode dispersed in porous three-dimensional current collector for lithium **battery**)

IT **7440-31-5**, Tin, uses **37218-62-5 65777-94-8 71849-44-0**
RL: DEV (Device component use); USES (Uses)
(current collector; fabrication of lithium **electrode** dispersed in porous three-dimensional current collector for lithium **battery**)

RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

RN 37218-62-5 HCAPLUS
CN Bismuth alloy, nonbase, Bi,Li (9CI) (CA INDEX NAME)

Component	Component Registry Number
Bi	7440-69-9
Li	7439-93-2

RN 65777-94-8 HCAPLUS
CN Boron alloy, nonbase, B,Li (9CI) (CA INDEX NAME)

Component	Component Registry Number
B	7440-42-8
Li	7439-93-2

RN 71849-44-0 HCAPLUS
CN Lithium alloy, base, Li,Sb (9CI) (CA INDEX NAME)

Component	Component Registry Number
Li	7439-93-2
Sb	7440-36-0

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 14 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2002:595192 HCAPLUS
DN 137:143058
TI Preparation of a lithium-metal composite electrode for lithium secondary **battery**

IN Cho, Byung-Won; Cho, Won-Il; Kim, Hyung-Sun; Yoon, Young-Soo; Kim, Un-Sek; Nam, Sang-Cheol; Lee, Sung-Won; Park, Ho-Young
PA Korea Institute of Science and Technology, S. Korea
SO PCT Int. Appl., 17 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2002061862	A1	20020808	WO 2001-KR131	20010131
W: JP, KR, US				
PRAI WO 2001-KR131		20010131		

AB The present invention relates to a lithium-metal composite electrode, its preparation method and lithium secondary **battery.** The lithium-metal composite electrode comprises lithium particles or lithium alloy particles mixed with metal, and it is obtained by simultaneously depositing lithium or a lithium alloy with metal on a current collector using a thin fabrication technique, and pressing the obtained.

IC ICM H01M004-38
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST **battery** lithium metal composite electrode
IT Ablation
Electric arc
Electron beams
Ion beams
(deposition by; preparation of lithium-metal composite electrode for lithium secondary **battery**)
IT Secondary **batteries**
(lithium; preparation of lithium-metal composite electrode for lithium secondary **battery**)
IT **Battery** anodes
Composites
Sputtering
(preparation of lithium-metal composite electrode for lithium secondary **battery**)
IT Lithium alloy, base
RL: DEV (Device component use); USES (Uses)
(preparation of lithium-metal composite electrode for lithium secondary **battery**)
IT 1313-13-9, Manganese dioxide, uses 1314-62-1, Vanadium pentoxide, uses 7429-90-5, Aluminum, uses 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-93-2, Lithium, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses **7440-31-5**, Tin, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-36-0, Antimony, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 7719-09-7, Thionyl chloride 12031-65-1, Lithium nickel oxide linio2 12037-42-2, Vanadium oxide v6o13 12057-17-9, Lithium manganese oxide limn2o4 12190-79-3, Cobalt lithium oxide colio2 12798-95-7 **37218-62-5** 51311-17-2, Carbon fluoride 53680-59-4 **65777-94-8** 68848-64-6 **71849-44-0** 162004-08-2, Cobalt lithium nickel oxide colinio2
RL: DEV (Device component use); USES (Uses)
(preparation of lithium-metal composite **electrode** for lithium secondary **battery**)
IT **7440-31-5**, Tin, uses **37218-62-5** **65777-94-8**

71849-44-0
RL: DEV (Device component use); USES (Uses)
(preparation of lithium-metal composite **electrode** for lithium secondary **battery**)
RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

RN 37218-62-5 HCAPLUS
CN Bismuth alloy, nonbase, Bi,Li (9CI) (CA INDEX NAME)

Component	Component Registry Number
Bi	7440-69-9
Li	7439-93-2

RN 65777-94-8 HCAPLUS
CN Boron alloy, nonbase, B,Li (9CI) (CA INDEX NAME)

Component	Component Registry Number
B	7440-42-8
Li	7439-93-2

RN 71849-44-0 HCAPLUS
CN Lithium alloy, base, Li,Sb (9CI) (CA INDEX NAME)

Component	Component Registry Number
Li	7439-93-2
Sb	7440-36-0

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 15 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2002:388557 HCAPLUS
DN 136:404249
TI Anode active mass containing copper-silicon-indium-type compound and nonaqueous-electrolyte **battery**
IN Inoue, Hiroshi; Yamada, Shinichiro; Endo, Takuya
PA Sony Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002151065	A2	20020524	JP 2000-339546	20001107
	US 2002197531	A1	20021226	US 2001-53467	20011107
PRAI	JP 2000-339546	A	20001107		

AB The **anode** active mass is represented as a compound A-B-C, where A, B, and C are selected from (1) Cu and/or Fe, (2) Si and/or **Sn**,

and (3) In, Sb, Bi, and/or Pb, resp. Claimed **battery** is equipped with an **anode** containing the active mass. The active mass has good Li-intercalating property and the **battery** provides high discharge capacity and long cycle life.

IC ICM H01M004-38
ICS H01M004-02; H01M004-58; H01M010-40

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)

ST copper silicon indium antimony anode lithium intercalation nonaq **battery**

IT **Battery** anodes
(Cu-Si-In-**Sb**-based **alloy** for **Li** -intercalating anode in nonaq. **battery**)

IT Secondary **batteries**
(**lithium**; Cu-Si-In-**Sb**-based **alloy** for **Li**-intercalating anode in nonaq. **battery**)

IT 429681-98-1 429681-99-2 429682-00-8 429682-01-9 429682-02-0
429682-04-2 429682-05-3 429682-06-4 429682-07-5 429682-08-6
429682-09-7 429682-10-0 429682-11-1 429682-12-2
RL: **DEV (Device component use)**; USES (Uses)
(Cu-Si-In-**Sb**-based **alloy** for **Li** -intercalating anode in nonaq. **battery**)

IT 7439-92-1, Lead, uses 7440-31-5, **Tin**, uses 7440-69-9, Bismuth, uses
RL: **DEV (Device component use)**; USES (Uses)
(**alloys** containing; Cu-Si-In-**Sb**-based **alloy** for **Li**-intercalating **anode** in nonaq. **battery**)

L34 ANSWER 16 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2002:10748 HCAPLUS
DN 136:72294
TI Novel alloy compositions for use as electrode materials in **batteries** and for hydrogen production
IN Schmidt, David G.
PA Millennium Energy, Llc, USA
SO PCT Int. Appl., 58 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002000950	A2	20020103	WO 2001-US19996	20010621
	WO 2002000950	A3	20020627		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	AU 2001071391	A5	20020108	AU 2001-71391	20010621
	US 2002022160	A1	20020221	US 2001-886935	20010621
PRAI	US 2000-213945P	P	20000623		
	WO 2001-US19996	W	20010621		

AB This invention provides new compns., methods for making these compns., and methods of using the compns. in a variety of energy-related applications.

These compns. are useful as electrode materials in devices such as **batteries**, capacitors, fuel cells and similar devices as also in the direct production of hydrogen and oxygen gas. The new compns. of the present invention comprise: (a) one or more of the transition metal elements; optionally (b) aluminum; optionally (c) one or more of the group 1A alkali metal elements; (d) one or more elements and/or compds. having high mobility values for electrons; and (e) a source of ionizing radiation. Thus, components a, d and e are required ingredients of the present invention, and components b and c are both optional. Components b and c may be used independently alone, together, or not at all.

IC ICM C22C

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49, 56, 72, 76

ST **battery** electrode material alloy compn; hydrogen prodn electrode material alloy compn; fuel cell electrode material alloy compn; capacitor electrode material alloy compn

IT **Battery** electrodes
Capacitor electrodes
Electron mobility
Fuel cell electrodes
(alloy compns. for electrode materials in **batteries** and for hydrogen production)

IT Alkali metals, processes
Transition metals, processes
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process)
(alloy compns. for electrode materials in **batteries** and for hydrogen production)

IT Melting
(arc; alloy compns. for electrode materials in **batteries** and for hydrogen production)

IT Inductance
(melting; alloy compns. for electrode materials in **batteries** and for hydrogen production)

IT 7732-18-5, Water, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(alloy compns. for electrode materials in **batteries** and for hydrogen production)

IT 409-21-2, Silicon carbide sic, uses 1303-00-0, Gallium arsenide, uses 1303-11-3, Indium arsenide, uses 1306-25-8, Cadmium telluride, uses 1312-41-0, Indium antimonide 1314-91-6, Lead telluride 7440-44-0, Carbon, uses 7785-23-1, Silver bromide 12006-14-3, Cadmium tin arsenide (CdSnAs2) 12014-06-1, Cadmium indium telluride (CdIn2Te4) 12014-17-4, Cadmium silicon phosphide (CdSiP2) 12037-74-0, Silicon zinc phosphide SiZnP2 12068-90-5, Mercury telluride hgte 12069-00-0, Lead selenide 12362-59-3, Indium mercury telluride (In2Hg5Te8) 20601-83-6, Mercury selenide hgse 22398-80-7, Indium phosphide, uses 22831-42-1, Aluminum arsenide
RL: DEV (Device component use); USES (Uses)
(alloy compns. for electrode materials in **batteries** and for hydrogen production)

IT 118309-86-7P 188803-13-6P 198060-90-1P 352543-69-2P 352543-70-5P 352543-78-3P 352543-82-9P 384329-81-1P **384329-82-2P** **384329-83-3P** **384329-84-4P** 384329-85-5P 384329-86-6P 384329-87-7P 384329-88-8P 384329-89-9P **384329-90-2P** **384329-91-3P**
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(alloy compns. for **electrode** materials in **batteries** and for hydrogen production)

IT 1333-74-0P, Hydrogen, preparation 7782-44-7P, Oxygen, preparation
RL: IMF (Industrial manufacture); PREP (Preparation)
(alloy compns. for electrode materials in **batteries** and for hydrogen production)

IT 7429-90-5, Aluminum, processes 7439-93-2, Lithium, processes 7440-02-0, Nickel, processes 7440-09-7, Potassium, processes 7440-21-3, Silicon, processes 7440-23-5, Sodium, processes **7440-31-5**, Tin, processes 7440-56-4, Germanium, processes 13494-80-9, Tellurium, processes
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process)
(alloy compns. for **electrode** materials in **batteries** and for hydrogen production)

IT 7440-06-4, Platinum, uses
RL: MOA (Modifier or additive use); USES (Uses)
(alloy containing; alloy compns. for electrode materials in **batteries** and for hydrogen production)

IT 7440-29-1, Thorium, processes
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process)
(ionizing radiation source; alloy compns. for electrode materials in **batteries** and for hydrogen production)

IT **384329-82-2P 384329-83-3P 384329-84-4P 384329-90-2P 384329-91-3P**
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(alloy compns. for **electrode** materials in **batteries** and for hydrogen production)

RN 384329-82-2 HCAPLUS
CN Aluminum alloy, nonbase, Al,In,Li,Pd,Sb,Sn (9CI) (CA INDEX NAME)

Component	Component Registry Number
Al	7429-90-5
In	7440-74-6
Li	7439-93-2
Pd	7440-05-3
Sb	7440-36-0
Sn	7440-31-5

RN 384329-83-3 HCAPLUS
CN Aluminum alloy, nonbase, Al,In,Li,Ni,Sb (9CI) (CA INDEX NAME)

Component	Component Registry Number
Al	7429-90-5
In	7440-74-6
Li	7439-93-2
Ni	7440-02-0
Sb	7440-36-0

RN 384329-84-4 HCAPLUS
CN Aluminum alloy, nonbase, Al,Ge,In,Li,Ni,Pd,Sb,Sn (9CI) (CA INDEX NAME)

Component	Component Registry Number

Component	Component Registry Number
Al	7429-90-5
Ge	7440-56-4
In	7440-74-6
Li	7439-93-2
Ni	7440-02-0
Pd	7440-05-3
Sb	7440-36-0
Sn	7440-31-5

RN 384329-90-2 HCAPLUS
CN Indium alloy, nonbase, In,Li,Ni (9CI) (CA INDEX NAME)

Component	Component Registry Number
In	7440-74-6
Li	7439-93-2
Ni	7440-02-0

RN 384329-91-3 HCAPLUS
CN Lithium alloy, nonbase, Li,Ni,Sb (9CI) (CA INDEX NAME)

Component	Component Registry Number
Li	7439-93-2
Ni	7440-02-0
Sb	7440-36-0

IT **7440-31-5**, Tin, processes
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process)
(alloy compns. for **electrode** materials in **batteries** and for hydrogen production)
RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

L34 ANSWER 17 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2001:924178 HCAPLUS
DN 136:56397
TI Fabrication of multilayered lithium electrode for use in lithium **batteries**
IN Yun, Kyungsuk; Cho, Byungwon; Cho, Wonil; Kim, Hyungsun; Yoon, Youngsoo; Kim, Unseok; Nam, Sangcheol; Lim, Youngchang; Choi, Changhoon; Park, Hoyoung
PA Korea Institute of Science and Technology, S. Korea
SO PCT Int. Appl., 22 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001097304	A1	20011220	WO 2000-KR616	20000612

W: JP, KR, US
PRAI WO 2000-KR616 20000612
AB The present invention provides a multi-layered lithium electrode formed on a current collector with sequential stacks of 10 Å-100 μm thick lithium or lithium alloy layer and 1 Å-10 μm thick-porous metal or porous carbon layer, its fabrication method, and lithium **batteries** comprising it. More particularly, it provides to the lithium electrode which is fabricated by sequentially forming 10 Å-100 μm thick lithium or lithium alloy layer on a Cu- or Ni-current collector, and 1 Å-10 μm thick porous metal or porous carbon layer, and lithium **batteries** comprising it.
IC ICM H01M004-04
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 56
ST **battery** multilayered lithium electrode
IT Electric arc
Ion beams
Laser ablation
(deposition by; fabrication of multilayered lithium electrode for use in lithium **batteries**)
IT Coating process
(electron-beam; fabrication of multilayered lithium electrode for use in lithium **batteries**)
IT **Battery** anodes
Sputtering
(fabrication of multilayered lithium electrode for use in lithium **batteries**)
IT Carbon black, uses
Coke
RL: TEM (Technical or engineered material use); USES (Uses)
(fabrication of multilayered lithium electrode for use in lithium **batteries**)
IT Secondary **batteries**
(lithium; fabrication of multilayered lithium electrode for use in lithium **batteries**)
IT Molding
(press; fabrication of multilayered lithium electrode for use in lithium **batteries**)
IT Coating process
(thermal deposition; fabrication of multilayered lithium electrode for use in lithium **batteries**)
IT Lithium alloy, base
RL: DEV (Device component use); USES (Uses)
(fabrication of multilayered lithium electrode for use in lithium **batteries**)
IT 108-32-7, Propylene carbonate 623-53-0, Ethyl methyl carbonate 1313-13-9, Manganese dioxide, uses 1314-62-1, Vanadium pentoxide, uses 7439-93-2, Lithium, uses 7719-09-7, Thionyl chloride 11113-63-6, Graphite fluoride 12031-65-1, Lithium nickel oxide linio2 12037-42-2, Vanadium oxide v6o13 12057-17-9, Lithium manganese oxide limn2o4 12190-79-3, Cobalt lithium oxide colio2 12798-95-7 21324-40-3, Lithium hexafluorophosphate **37218-62-5** 53680-59-4 **65777-94-8** 68848-64-6 **71849-44-0** 162004-08-2, Cobalt lithium nickel oxide colinio2
RL: DEV (Device component use); USES (Uses)
(fabrication of multilayered lithium **electrode** for use in lithium **batteries**)
IT 7429-90-5, Aluminum, uses 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses

7440-02-0, Nickel, uses 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses **7440-31-5**, Tin, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-36-0, Antimony, uses 7440-44-0, Carbon, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 7782-42-5, Graphite, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fabrication of multilayered lithium **electrode** for use in lithium **batteries**)

IT **37218-62-5 65777-94-8 71849-44-0**
RL: DEV (Device component use); USES (Uses)
(fabrication of multilayered lithium **electrode** for use in lithium **batteries**)

RN 37218-62-5 HCAPLUS
CN Bismuth alloy, nonbase, Bi,Li (9CI) (CA INDEX NAME)

Component	Component Registry Number
Bi	7440-69-9
Li	7439-93-2

RN 65777-94-8 HCAPLUS
CN Boron alloy, nonbase, B,Li (9CI) (CA INDEX NAME)

Component	Component Registry Number
B	7440-42-8
Li	7439-93-2

RN 71849-44-0 HCAPLUS
CN Lithium alloy, base, Li,Sb (9CI) (CA INDEX NAME)

Component	Component Registry Number
Li	7439-93-2
Sb	7440-36-0

IT **7440-31-5**, Tin, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fabrication of multilayered lithium **electrode** for use in lithium **batteries**)

RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 18 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2001:598336 HCAPLUS
DN 135:155259
TI Alloy compositions for use as electrode materials and for hydrogen production

IN Schmidt, David G.
PA Millennium Energy, L.L.C., USA
SO PCT Int. Appl., 50 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001059858	A2	20010816	WO 2001-US40026	20010205
	WO 2001059858	A3	20020314		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	AU 2001047954	A5	20010820	AU 2001-47954	20010205
	US 2001046113	A1	20011129	US 2001-775550	20010205
PRAI	US 2000-181263P	P	20000209		
	WO 2001-US40026	W	20010205		

AB This invention provides novel metal alloys, methods for making these alloys, and methods of using these alloys in numerous applications. The alloys of the present invention comprise the following components: (A) one or more of the transition metal elements; at least one of either (B) aluminum or (C) one or more of the group 1A alkali metal elements; and (D) one or more elements and/or compds. having high mobility values for electrons. Thus, components A, D, and at least one of components B or C comprise the present invention. These alloys are useful as electrode materials in devices such as **batteries**, capacitors, fuel cells, and similar devices, and are also useful in the direct production of hydrogen gas.

IC ICM H01M004-00
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 56, 72, 76
ST alloy compn electrode material; **battery** alloy compn electrode material; capacitor alloy compn electrode material; fuel cell alloy compn electrode material; hydrogen prodn alloy compn electrode material
IT Alloys, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(alkali metal; alloy compns. for use as electrode materials and for hydrogen production)
IT **Battery** anodes
Battery electrodes
Capacitor electrodes
Electrodes
Electron mobility
Fuel cell electrodes
Fuel cells
Sintering
Vapor deposition process
(alloy compns. for use as electrode materials and for hydrogen production)
IT Transition metal alloys
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(alloy compns. for use as electrode materials and for hydrogen production)

IT Alkali metals, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(alloys; alloy compns. for use as electrode materials and for hydrogen production)

IT Melting
(arc; alloy compns. for use as electrode materials and for hydrogen production)

IT 409-21-2, Silicon carbide sic, uses 1303-00-0, Gallium arsenide, uses 1303-11-3, Indium arsenide, uses 1304-82-1, Bismuth telluride bi2te3 1306-25-8, Cadmium telluride, uses 1312-41-0, Indium antimonide 1314-91-6, Lead telluride 7440-21-3, Silicon, uses **7440-31-5**, Tin, uses 7440-44-0, Carbon, uses 7440-56-4, Germanium, uses 7785-23-1, Silver bromide 11138-42-4, Mercury selenide 12006-14-3, Cadmium tin arsenide cdsnas2 12014-06-1, Cadmium indium telluride cdin2te4 12014-17-4, Cadmium silicon phosphide CdSiP2 12037-74-0, Silicon zinc phosphide SiZnP2 12064-03-8, Gallium antimonide 12068-90-5, Mercury telluride 12069-00-0, Lead selenide 12362-59-3, Indium mercury telluride in2hg5te8 13494-80-9, Tellurium, uses 22398-80-7, Indium phosphide, uses 22831-42-1, Aluminum arsenide
RL: DEV (Device component use); USES (Uses)
(alloy compns. for use as **electrode** materials and for hydrogen production)

IT 352543-57-8P 352543-58-9P **352543-59-0P 352543-60-3P**
352543-61-4P 352543-62-5P 352543-63-6P 352543-64-7P 352543-65-8P
352543-66-9P 352543-68-1P 352543-69-2P 352543-70-5P 352543-71-6P
352543-72-7P 352543-74-9P 352543-75-0P 352543-76-1P
352543-77-2P 352543-78-3P **352543-79-4P**
352543-80-7P 352543-81-8P 352543-82-9P 352543-85-2P
352543-89-6P 352543-92-1P 352543-93-2P
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(alloy compns. for use as **electrode** materials and for hydrogen production)

IT 1333-74-0P, Hydrogen, preparation
RL: IMF (Industrial manufacture); PREP (Preparation)
(alloy compns. for use as electrode materials and for hydrogen production)

IT **7440-31-5**, Tin, uses
RL: DEV (Device component use); USES (Uses)
(alloy compns. for use as **electrode** materials and for hydrogen production)

RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

IT **352543-59-0P 352543-60-3P 352543-77-2P**
352543-79-4P 352543-80-7P 352543-81-8P
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(alloy compns. for use as **electrode** materials and for hydrogen production)

RN 352543-59-0 HCAPLUS
CN Antimony alloy, base, Sb 31,In 29,Al 20,Li 10,Ni 10 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number

Sb	31	7440-36-0
In	29	7440-74-6
Al	20	7429-90-5
Li	10	7439-93-2
Ni	10	7440-02-0

RN 352543-60-3 HCAPLUS
CN Tin alloy, base, Sn 38,Sb 20,In 19,Pd 8.5,Ni 6.7,Ge 3.5,Al 3,Li 1.5 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Sn	38	7440-31-5
Sb	20	7440-36-0
In	19	7440-74-6
Pd	8.5	7440-05-3
Ni	6.7	7440-02-0
Ge	3.5	7440-56-4
Al	3	7429-90-5
Li	1.5	7439-93-2

RN 352543-77-2 HCAPLUS
CN Indium alloy, nonbase, In,Li,Ni,Sb (9CI) (CA INDEX NAME)

Component	Component Registry Number
In	7440-74-6
Li	7439-93-2
Ni	7440-02-0
Sb	7440-36-0

RN 352543-79-4 HCAPLUS
CN Antimony alloy, base, Sb 31,In 29,Ni 26,Li 10,Ge 4 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Sb	31	7440-36-0
In	29	7440-74-6
Ni	26	7440-02-0
Li	10	7439-93-2
Ge	4	7440-56-4

RN 352543-80-7 HCAPLUS
CN Antimony alloy, base, Sb 31,Ni 30,In 29,Li 10 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Sb	31	7440-36-0
Ni	30	7440-02-0
In	29	7440-74-6
Li	10	7439-93-2

RN 352543-81-8 HCAPLUS
CN Tin alloy, base, Sn 38,Sb 20,In 19,Ni 9.7,Pd 8.5,Ge 3.5,Li 1.5 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Sn	38	7440-31-5
Sb	20	7440-36-0
In	19	7440-74-6
Ni	9.7	7440-02-0
Pd	8.5	7440-05-3
Ge	3.5	7440-56-4
Li	1.5	7439-93-2

L34 ANSWER 19 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2001:181054 HCAPLUS
DN 134:210526
TI Anodes for secondary lithium **batteries** and the **batteries**
IN Sonoda, Tsukasa; Fujieda, Takuya
PA Hyogo Prefecture, Japan; Agency of Industrial Sciences and Technology
SO Jpn. Kokai Tokkyo Koho, 8 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001068095	A2	20010316	JP 1999-238151	19990825
	JP 3738293	B2	20060125		
PRAI	JP 1999-238151		19990825		

AB The **anodes** use collectors having a plated **Sn**-Bi layer.
IC ICM H01M004-02
ICS H01M004-38; H01M010-40
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST secondary lithium **battery anode** collector; lithium **battery anode** bismuth **tin** plated collector
IT **Battery anodes**
(**lithium anode** with **bismuth-tin alloy** plated collectors for secondary lithium **batteries**)
IT 7439-93-2, Lithium, uses 7440-50-8, Copper, uses
RL: **DEV (Device component use)**; USES (Uses)
(**lithium anode** with **bismuth-tin alloy** plated collectors for secondary lithium **batteries**)
IT 39396-99-1 135697-80-2
RL: MOA (Modifier or additive use); USES (Uses)
(**lithium anode** with **bismuth-tin alloy** plated collectors for secondary lithium **batteries**)

L34 ANSWER 20 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2001:143485 HCAPLUS
DN 134:210468
TI New anode systems for lithium ion cells
AU Crosnier, O.; Brousse, T.; Devaux, X.; Fragnaud, P.; Schleich, D. M.
CS Laboratoire de Genie des Materiaux, ISITEM, Nantes, Fr.
SO Journal of Power Sources (2001), 94(2), 169-174
CODEN: JPSODZ; ISSN: 0378-7753
PB Elsevier Science S.A.

DT Journal
LA English
AB Samples of small particle size bismuth and electroplated Ni-**Sn** alloy were tested as **anodes** for lithium-ion **batteries** to highlight the effects of volume changes during charge and discharge on the cycling life of the **electrodes.** Bismuth was used for its relatively high potential of **Li-Bi alloys** formation (0.8-0.6 V) which prevents other components within the **electrode** from being electrochem. active vs. lithium in this potential window. Electrochem. tests have shown that the capacity fade during cycling is largely dependent of the amount of Bi in the **electrode.** Electroplated Ni-**Sn** alloys were directly used as **anodes** and do not need to be reground nor mixed with additives. Different electroplating conditions, leading to different morphol., highlight the leading role of the particle size of the active materials used in the lithium-ion cells.
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST nickel **tin** alloy **anode** lithium ion **battery**; bismuth **anode** lithium ion **battery**
IT **Battery anodes**
(use of nickel-**tin alloy** or **bismuth** as **anode** for **lithium**-ion **batteries**)
IT 7440-69-9, Bismuth, uses 11110-83-1
RL: **DEV (Device component use)**; USES (Uses)
(use of nickel-**tin alloy** or **bismuth** as **anode** for **lithium**-ion **batteries**)
RE.CNT 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 21 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2001:94032 HCAPLUS
DN 134:134110
TI High energy glass containing carbon electrode for lithium **battery**
IN Nazri, Gholam-Abbas
PA Delphi Technologies, Inc., USA
SO U.S., 13 pp.
CODEN: USXXAM
DT Patent
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 6183912	B1	20010206	US 1999-322517	19990528
PRAI US 1998-87149P	P	19980529		

AB A novel high energy d. electrode for rechargeable lithium **batteries**, and process of making same has been developed. The process forms a composite which (1) comprises submicron particles of lithium-alloying sp elements embedded in a conductive matrix of carbon, graphite or a lithium-containing, ionically-conductive glass, and (2) is capable of reversibly accepting and donating lithium. The particles are produced within the conductive matrix through the reaction of halides (e.g., Cl) of the sp elements with Si, B, S or P, which forms volatile halides (e.g., SiClx, SClx, BClx and PClx) and submicron size (i.e., less than 0.1 μm, and preferably nanometer size) sp element particles distributed throughout the matrix. By sp element is meant an element whose valence electrons reside in the s and p orbitals of the atoms and are found in the third, fourth and fifth rows of the group III, IV and V elements of the periodic table. Hence elements such as Pb, Sn, Sb, Bi, Al, Ga, Ge, In and Ti are seen to be useful with this invention.

Carbon/graphite is the preferred conductive matrix because it has a capability of retaining some reversible lithium itself. Lithium ion-conducting glasses are also useful. Electrochem. studies of the composite anodes in Li cells indicate superior energy capacity over carbonaceous anodes currently used in com. **batteries**, (e.g., LiC6). Anodes made according to this invention will contain about 10% to about 80%, by weight, of the submicron elemental material, and the balance conductive matrix, binder materials (e.g., Ca 6%-8% PVDF or EPDM), and some (e.g., about 1% to 12%) conductive diluents (e.g., carbon particles). The anodes will preferably contain 10-20% of the submicron elemental material for achieving prolonged cycle life.

IC ICM H01M004-02
INCL 429231800
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 57
ST lithium **battery** anode glass contg carbon
IT Intercalation
(electrochem.; high energy glass containing carbon electrode for lithium **battery**)
IT **Battery** anodes
(high energy glass containing carbon electrode for lithium **battery**)
IT Carbonaceous materials (technological products)
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(high energy glass containing carbon electrode for lithium **battery**)
IT Carbon black, uses
RL: MOA (Modifier or additive use); USES (Uses)
(high energy glass containing carbon electrode for lithium **battery**)
IT Halides
RL: RCT (Reactant); RACT (Reactant or reagent)
(high energy glass containing carbon electrode for lithium **battery**)
IT EPDM rubber
RL: TEM (Technical or engineered material use); USES (Uses)
(high energy glass containing carbon electrode for lithium **battery**)
IT Glass, uses
RL: DEV (Device component use); USES (Uses)
(lithium ion-conductive; high energy glass containing carbon electrode for lithium **battery**)
IT Secondary **batteries**
(lithium; high energy glass containing carbon electrode for lithium **battery**)
IT 7440-50-8, Copper, uses
RL: DEV (Device component use); USES (Uses)
(current collector; high energy glass containing carbon electrode for lithium **battery**)
IT 96-49-1, Ethylene carbonate 616-38-6, Dimethyl carbonate 7429-90-5, Aluminum, uses 7439-92-1, Lead, uses **7440-31-5**, Tin, uses 7440-32-6, Titanium, uses 7440-36-0, Antimony, uses 7440-55-3, Gallium, uses 7440-56-4, Germanium, uses 7440-69-9, Bismuth, uses 7440-74-6, Indium, uses 21324-40-3, Lithium hexafluorophosphate
RL: DEV (Device component use); USES (Uses)
(high energy glass containing carbon **electrode** for lithium **battery**)
IT 7439-93-2, Lithium, uses

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(high energy glass containing carbon electrode for lithium **battery**)

IT **37218-62-5** 39300-27-1 53680-59-4 68848-64-6
73906-94-2
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(high energy glass containing carbon **electrode** for lithium **battery**)

IT 7440-21-3, Silicon, reactions 7758-95-4, Lead dichloride 7772-99-8, Tin dichloride, reactions 7787-60-2, Bismuth trichloride 21432-78-0, Antimony dichloride
RL: RCT (Reactant); RACT (Reactant or reagent)
(high energy glass containing carbon electrode for lithium **battery**)

IT 7782-42-5, Graphite, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(high energy glass containing carbon electrode for lithium **battery**)

IT **7440-31-5**, Tin, uses
RL: DEV (Device component use); USES (Uses)
(high energy glass containing carbon **electrode** for lithium **battery**)

RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

IT **37218-62-5 73906-94-2**
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(high energy glass containing carbon **electrode** for lithium **battery**)

RN 37218-62-5 HCAPLUS
CN Bismuth alloy, nonbase, Bi,Li (9CI) (CA INDEX NAME)

Component	Component Registry Number
Bi	7440-69-9
Li	7439-93-2

RN 73906-94-2 HCAPLUS
CN Lithium alloy, nonbase, Li,Sb (9CI) (CA INDEX NAME)

Component	Component Registry Number
Li	7439-93-2
Sb	7440-36-0

RE.CNT 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 22 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2000:859322 HCAPLUS
DN 134:88693
TI Electrochemical properties of **Li-Mg alloy** electrodes for **lithium batteries**

AU Shi, Zhong; Liu, Meilin; Naik, Devang; Gole, James L.
CS School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, GA, 30332, USA
SO Journal of Power Sources (2001), 92(1-2), 70-80
CODEN: JPSODZ; ISSN: 0378-7753
PB Elsevier Science S.A.
DT Journal
LA English
AB **Li-Mg alloy electrodes** are prepared by two methods: (1) direct-alloying through the melting of mole percent specific mixts. of Li and Mg metal under vacuum and (2) the kinetically-controlled vapor formation and deposition (KCVD) of a **Li-Mg alloy** on a substrate. It is found that processing conditions greatly influence the microstructures and surface morphologies, and hence, the electrochem. properties of the **Li-Mg alloy electrodes.** When applying the KCVD technique, the composition of each prepared alloy is determined by independently varying the temperature of the molten lithium, the temperature of magnesium with which the lithium interacts, and the temperature of the substrate on which the intimately mixed Li-Mg mixture is deposited. Here, the required temperature for lithium induced Mg vaporization is more than 200°C below the magnesium m.p. The effect of these variable temps. on the microstructure, morphol., and electrochem. properties of the vapor-deposited alloys has been studied. The diffusion coeffs. for **lithium** in the **Li-Mg alloy electrodes** prepared by the KCVD method are in the range 1.2+10-7 to 5.2+10-7 cm2 s-1 at room temperature, two to three orders of magnitude larger than those in other lithium alloy systems (e.g. 6.0+10-10 cm2 s-1 in LiAl). These observations suggest that **Li-Mg alloys** prepared by the KCVD method might be used effectively to prevent dendrite formation, improving the cycleability of lithium **electrodes** and the rechargeability of lithium **batteries** as a result of the high diffusion coefficient of lithium atoms in the **Li-Mg alloy. Li-Mg alloy electrodes** also appear to show not only the potential for higher rate capabilities (power densities) but also for larger capacities (energy densities) which might considerably exceed those of lithiated carbon or **Sn**-based **electrodes** for lithium **batteries.**
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 56, 72
ST **lithium magnesium alloy** anode **battery**
IT **Battery** anodes
Cyclic voltammetry
Vapor deposition process
(electrochem. properties of **Li-Mg alloy** electrodes for **lithium batteries**)
IT Secondary **batteries**
(lithium; electrochem. properties of **Li-Mg alloy** electrodes for **lithium batteries**)
IT Diffusion
(of lithium; electrochem. properties of **Li-Mg alloy** electrodes for **lithium batteries**)
IT 78085-08-2 113574-32-6 136570-90-6 316819-36-0
RL: **DEV (Device component use)**; USES (Uses)
(electrochem. properties of **Li-Mg alloy**

electrodes for **lithium batteries**)
RE.CNT 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L34 ANSWER 23 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1998:811833 HCAPLUS
DN 130:54872
TI Lithium secondary **batteries**, portable appliances, cars and bikes, using the **batteries**, and apparatus for storage of electric power
IN Takeuchi, Seiji; Honbo, Hidetoshi; Muranaka, Kiyoshi
PA Hitachi, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 8 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 10334889	A2	19981218	JP 1997-143756	19970602
PRAI JP 1997-143756		19970602		

AB The anodes of the **batteries** comprise mixts. of (1) graphite particles carrying ≥2 kinds of metals containing at least metal which alloys with Li and that do not alloy with Li and (2) 1-60 weight% amorphous C particles. Portable elec. appliances, cars, and bikes and elec. power storage systems using the **batteries** are also claimed.
IC ICM H01M004-04
ICS H01M004-58; H01M010-40
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST lithium secondary **battery** graphite anode; power storage system lithium secondary **battery**; carbon amorphous lithium secondary **battery**; vehicle elec lithium secondary **battery**; elec appliance lithium secondary **battery**; car elec lithium secondary **battery**
IT Electric vehicles
(automobiles; secondary lithium **batteries** with amorphous C/graphite anodes containing Li alloying metals and nonalloying metals for)
IT Electric vehicles
(bikes; secondary lithium **batteries** with amorphous C/graphite anodes containing Li alloying metals and nonalloying metals for)
IT Automobiles
(elec.; secondary lithium **batteries** with amorphous C/graphite anodes containing Li alloying metals and nonalloying metals for)
IT Secondary **batteries**
(lithium; secondary lithium **batteries** with amorphous C/graphite anodes containing Li alloying metals and nonalloying metals)
IT Electric appliances
(portable; secondary lithium **batteries** with amorphous C/graphite anodes containing Li alloying metals and nonalloying metals)
IT **Battery** anodes
Energy storage systems
(secondary lithium **batteries** with amorphous C/graphite anodes containing Li alloying metals and nonalloying metals)
IT 7440-22-4P, **Silver**, uses 7440-31-5P, **Tin**, uses
RL: **DEV (Device component use)**; PNU (Preparation, unclassified); **PREP (Preparation)**; USES (Uses)
(**Li alloying** metal; secondary lithium **batteries** with amorphous C/graphite **anodes** containing Li alloying metals and nonalloying metals)

IT 7440-44-0, Carbon, uses
RL: DEV (Device component use); USES (Uses)
(amorphous; secondary lithium **batteries** with amorphous C/graphite anodes containing Li alloying metals and nonalloying metals)
IT 7440-50-8P, Copper, uses
RL: DEV (Device component use); PNU (Preparation, unclassified); **PREP (Preparation)**; USES (Uses)
(lithium nonalloying metal; secondary lithium **batteries** with amorphous C/graphite anodes containing Li alloying metals and nonalloying metals)
IT 7782-42-5, Graphite, uses
RL: DEV (Device component use); USES (Uses)
(secondary lithium **batteries** with amorphous C/graphite anodes containing Li alloying metals and nonalloying metals)

L34 ANSWER 24 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1998:656260 HCAPLUS
DN 129:291898
TI Lithium ion secondary **batteries** with nonaqueous electrolytes
IN Miyasaka, Isao; Matsufuji, Akihiro
PA Fuji Photo Film Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 10270012	A2	19981009	JP 1997-69815	19970324
PRAI	JP 1997-69815		19970324		

AB In the title **batteries** comprising Li transition metal mixed oxide cathodes, Li intercalating anodes, and nonaq. electrolytes; dispersions of **Ag** or **Ag-Li alloys** having primary particle size ≤1 μm are added to the active mass layers. The **batteries** have excellent high rate discharging performance.
IC ICM H01M004-02
ICS H01M004-02; H01M004-48; H01M010-40
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST nonaq lithium ion secondary **battery** electrode; silver dispersion active mass lithium **battery**
IT **Battery** anodes
(active mass; addition of **Ag** or **Ag-Li alloy** particles to anode active mass in lithium ion nonaq. secondary **batteries**)
IT Particle size
(addition of **Ag** or **Ag-Li alloy** with controlled particles to anode active mass in lithium ion nonaq. secondary **batteries**)
IT Secondary **batteries**
(**lithium**; addition of **Ag** or **Ag-Li alloy** particles to anode active mass in lithium ion nonaq. secondary **batteries**)
IT 7440-22-4, Silver, uses 90066-19-6
RL: **DEV (Device component use)**; MOA (Modifier or additive use); USES (Uses)
(addition of **Ag** or **Ag-Li alloy** particles to anode active mass in lithium ion nonaq. secondary **batteries**)

IT 184346-57-4, **Tin** borate phosphate (**Sn**(BO2)0.5(PO4)0.5)
188947-66-2, Potassium **tin** metaphosphate oxide
(K0.2Sn1.5(PO3)O0.5) 214134-81-3 214134-82-4, Aluminum **tin**
borate phosphate silicate (Al0.1Sn0.8(BO3)0.3(PO4)0.2(SiO4)0.5)
RL: **DEV (Device component use)**; USES (Uses)
(**anode**; addition of **Ag** or **Ag-Li**
alloy particles to **anode** active mass in lithium ion
nonaq. secondary **batteries**)

IT 12190-79-3, Cobalt lithium oxide (CoLiO2) 204199-29-1, Cobalt lithium
manganese oxide (Co0.05Li1.05Mn1.95O4)
RL: **DEV (Device component use)**; USES (Uses)
(cathode; addition of **Ag** or **Ag-Li**
alloy particles to anode active mass in lithium ion nonaq.
secondary **batteries**)

L34 ANSWER 25 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1998:186606 HCAPLUS
DN 128:219450
TI Secondary solid state lithium **battery**, **battery** stack,
and their charging method
IN Takada, Kazunori; Fujino, Makoto; Iwamoto, Kazuya; Kondo, Shigeo
PA Matsushita Electric Industrial Co., Ltd., Japan
SO Eur. Pat. Appl., 25 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 829913	A2	19980318	EP 1997-115841	19970911
	EP 829913	A3	20021204		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
	JP 10144351	A2	19980529	JP 1997-227817	19970825
	JP 3601265	B2	20041215		
	US 6022640	A	20000208	US 1997-925136	19970908
	EP 1515388	A1	20050316	EP 2004-29351	19970911
	R: DE, FR, GB				
	US 6165646	A	20001226	US 1999-386900	19990831
	US 6352796	B1	20020305	US 1999-422056	19991021
PRAI	JP 1996-242754	A	19960913		
	US 1997-925136	A3	19970908		
	EP 1997-115841	A3	19970911		

AB The title **battery** with excellent charge and discharge cycle characteristics uses an anode active material which shows discontinuous change of potential caused by the Li ion intercalation and deintercalation, wherein the amount of the Li ion intercalated, until discontinuous change of potential of the anode takes place, is equal or smaller than the maximum amount of intercalation of Li ions within the range where Li ions are intercalated and deintercalated into or from the Li transition metal oxide reversibly.

IC ICM H01M010-36
ICS H01M004-40; H01M010-40; H01M010-44
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST lithium **battery** anode discontinuous potential change
IT Secondary **batteries**
(lithium **battery** and **battery** stack and their charging method)
IT **Battery** anodes

(lithium-intercalatable)
IT 7429-90-5, Aluminum, uses 7439-92-1, Lead, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses **7440-31-5**, Tin, uses 7440-32-6, Titanium, uses 7440-36-0, Antimony, uses 7440-38-2, Arsenic, uses 7440-43-9, Cadmium, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 12031-95-7, Lithium titanium oxide (Li4Ti5O12) 12039-13-3, Titanium disulfide **195881-15-3**
RL: DEV (Device component use); USES (Uses)
(**battery anode** showing discontinuous change of potential from lithium intercalatable)
IT **7440-31-5**, Tin, uses **195881-15-3**
RL: DEV (Device component use); USES (Uses)
(**battery anode** showing discontinuous change of potential from lithium intercalatable)
RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

RN 195881-15-3 HCAPLUS
CN Gallium alloy, base, Ga 98,Li 2 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ga	98	7440-55-3
Li	2	7439-93-2

L34 ANSWER 26 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1996:437816 HCAPLUS
DN 125:91273
TI Secondary lithium **batteries** and their anodes
IN Lin, Ariah; Peled, Emanuel
PA Ramot University Authority for Applied Research and Industrial Development, Israel
SO Israeli, 27 pp.
CODEN: ISXXAQ
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	IL 98401	A1	19951231	IL 1991-98401	19910606
PRAI	IL 1991-98401		19910606		

AB The **anodes** comprise an alloy of Li 2-30 and other elements, Al ≥20%, and Mg ≥5% Mg, the composition of the alloy being such that during charge and discharge of the **battery**, the curve of open-circuit voltage as well as the voltage under working conditions vs. Li content of the **anode** is of a gradually sloping nature. The alloy remains during charge and discharge in an intermediate phase range or in the varying stoichiometric range. The **anode** contains ≤5% elements selected from Cd, Zn, **Sn**, Pb, Si, In, Ga, Hg and Sb, the total of them being ≤40%; and ≤3% elements selected from As, P, Si, Ge, C, Fe, Ni, Cu, Cr, V, Co, Zn, Mo, Nb and Mn, the total of them ≤20%, the slope being >3 mV/1% change of the Li content of the **anode**. The **anode** alloy contains Li .apprx.2-30, Al .apprx.20-75, and Mg .apprx.5-50 with (Al + Mg)

≥50%, optionally with ≥further element.
IC ICM H01M004-38
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 56
ST **battery** anode **lithium** aluminum **magnesium alloy**
IT Anodes
(**battery**, aluminum-**lithium-magnesium alloy**)
IT 154598-93-3P 154598-95-5P 154598-96-6P 154598-97-7P 178820-82-1P 178820-83-2P
RL: DEV (Device component use); PNU (Preparation, unclassified); PRP (Properties); **PREP (Preparation)**; USES (Uses)
(**battery** anodes)

L34 ANSWER 27 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1996:430464 HCAPLUS
DN 125:119431
TI A light-intensity-modulation study of photoelectrochemical behavior of lithium and its alloys
AU Modestov, A. D.; Nimon, E. S.; Rotenberg, Z. A.; Churikov, A. V.
CS Frumkin Inst. Electrochem., Russian Acad. Sci., Moscow, 117071, Russia
SO Russian Journal of Electrochemistry (Translation of Elektrokhimiya) (1996), 32(6), 705-709
CODEN: RJELE3; ISSN: 1023-1935
PB MAIK Nauka/Interperiodica
DT Journal
LA English
AB Frequency spectra of photocurrent on **lithium** and **lithium -tin-cadmium alloy electrodes**, illuminated with an intensity modulated (by a harmonic law) light, were studied. The modulated illumination induced two processes which differ in their response time and potential dependence. The high-frequency photocurrent limit, which remains cathodic for both cathodic and anodic polarization of **electrode**, is of a photo-emissive nature, whereas low-frequency photocurrents are caused by heating the **electrode** surface with the incident light. The intensity modulation techniques make it possible to isolate the photoemission currents and the heat currents.
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 56
ST lithium **electrode** photoelectrochem behavior; cadmium lithium **tin electrode** photoelectrochem behavior; **battery** lithium **electrode** photoelectrochem behavior
IT **Anodes**
(**battery**, light intensity modulation study of photoelectrochem. behavior of **lithium** and **cadmium-lithium-tin alloy electrodes** for **batteries**)
IT 7439-93-2, Lithium, uses 179264-84-7
RL: **DEV (Device component use)**; PRP (Properties); USES (Uses)
(light intensity modulation study of photoelectrochem. behavior of **lithium** and **cadmium-lithium-tin alloy electrodes** for **batteries**)

L34 ANSWER 28 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1996:304009 HCAPLUS
DN 124:321585

TI Secondary solid-state lithium **battery** having high safety and being free from formation and growth of lithium dendrites
IN Iwamoto, Kazuya; Aotani, Noboru; Takada, Kazunori; Kondo, Shigeo
PA Matsushita Electric Industrial Co., Ltd., Japan
SO Eur. Pat. Appl., 23 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 704920	A1	19960403	EP 1995-306422	19950913
	EP 704920	B1	20000419		
	R: DE, FR, GB				
	JP 08148180	A2	19960607	JP 1995-240323	19950919
	JP 3332133	B2	20021007		
	US 5677081	A	19971014	US 1996-752969	19961202
PRAI	JP 1994-226578	A	19940921		
	JP 1994-226579	A	19940921		
	JP 1994-226580	A	19940921		
	US 1995-529129	B1	19950915		

AB The **battery** comprises a cathode having as an active material ≥1 compound selected from oxides and sulfides of a transition metal, a Li ion-conductive solid electrolyte of a glass comprising Li2S, and an anode having as an active material a metal (In, Pb, Zn, Sn, Sb, Bi, Cd, Ga and Ti) capable of forming an alloy with Li. At least 1 of the cathode active material and anode active material contains Li.

IC ICM H01M006-18
ICS H01M010-36
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 57
ST lithium secondary **battery** safety; cathode **battery** transition metal oxide sulfide
IT **Battery** electrolytes
(lithium sulfide-containing)
IT Safety
(secondary solid-state lithium **battery** having high safety and being free from formation and growth of lithium dendrites)
IT **Batteries**, secondary
(solid-state lithium having high safety and being free from formation and growth of lithium dendrites)
IT 7429-90-5, Aluminum, uses 7439-92-1, Lead, uses **7440-31-5**, Tin, uses 7440-32-6, Titanium, uses 7440-36-0, Antimony, uses 7440-43-9, Cadmium, uses 7440-55-3, Gallium, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 7440-74-6, Indium, uses 12606-98-3, Aluminum 60, lithium 40 (atomic) 12615-39-3, Aluminum 50, lithium 50 (atomic) 51613-60-6 53549-86-3, Indium 50, zinc 50 (atomic) 58549-43-2 **97037-08-6** 109146-91-0 142536-04-7 151850-68-9 151850-72-5 **161896-27-1** 176661-38-4 176661-39-5 **176661-40-8 176661-41-9 176661-42-0** **176661-43-1** 176661-46-4
RL: DEV (Device component use); USES (Uses)
(**battery anode**)
IT 1317-33-5, Molybdenum disulfide, uses 12031-65-1, Lithium nickel oxide (LiNiO2) 12039-13-3, Titanium disulfide 12057-17-9, Lithium manganese oxide (LiMn2O4) 12162-79-7, Lithium manganese oxide (LiMnO2) 12190-79-3, Cobalt lithium oxide (CoLiO2) 12201-18-2, Lithium molybdenum sulfide (LiMoS2) 55326-82-4, Lithium titanium sulfide LiTiS2) 92979-86-7, Lithium molybdenum sulfide (LiMo6S8) 108707-54-6, Lithium

manganese oxide (Li0.2Mn2O4) 110665-92-4, Lithium manganese oxide (Li0.3MnO2) 111706-40-2, Cobalt lithium oxide (CoLi0.1O2 114986-98-0, Lithium titanium sulfide (Li0.8TiS2) 138637-46-4, Lithium molybdenum sulfide (Li0.9MoS2) 176661-37-3, Lithium molybdenum sulfide (Li0.1Mo6S8) 176661-44-2, Lithium nickel oxide (Li0.1NiO2) 176661-45-3, Lithium nickel oxide (Li0.2NiO2)
RL: DEV (Device component use); USES (Uses)
(**battery** cathode)

IT 554-13-2, Dilithium carbonate 1302-81-4, Aluminum sulfide 1314-80-3, Phosphorus pentasulfide 10377-48-7, Dilithium sulfate 10377-52-3, Trilithium phosphate 12007-33-9, Boron sulfide (B2S3) 12057-24-8, Lithium oxide, uses 12136-58-2, Lithium sulfide (Li2S) 13759-10-9, Silicon disulfide
RL: DEV (Device component use); USES (Uses)
(lithium **battery** electrolyte containing)

IT **7440-31-5**, Tin, uses **97037-08-6 161896-27-1 176661-40-8 176661-41-9 176661-42-0 176661-43-1**
RL: DEV (Device component use); USES (Uses)
(**battery anode**)

RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

RN 97037-08-6 HCAPLUS
CN Indium alloy, base, In 94,Li 5.7 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
In	94	7440-74-6
Li	5.7	7439-93-2

RN 161896-27-1 HCAPLUS
CN Indium alloy, base, In 96,Li 3.9 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
In	96	7440-74-6
Li	3.9	7439-93-2

RN 176661-40-8 HCAPLUS
CN Antimony alloy, base, Sb 95,Li 5.4 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Sb	95	7440-36-0
Li	5.4	7439-93-2

RN 176661-41-9 HCAPLUS
CN Bismuth alloy, base, Bi 98,Li 2.2 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number

Bi	98	7440-69-9
Li	2.2	7439-93-2

RN 176661-42-0 HCAPLUS
CN Cadmium alloy, base, Cd 97,Li 2.6 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Cd	97	7440-43-9
Li	2.6	7439-93-2

RN 176661-43-1 HCAPLUS
CN Gallium alloy, base, Ga 96,Li 4.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ga	96	7440-55-3
Li	4.1	7439-93-2

L34 ANSWER 29 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1995:910537 HCAPLUS
DN 123:345733
TI Anodes providing Li secondary **batteries** with high charge-discharge capacity and energy density and long cycle life
IN Takada, Yoshinori; Sasaki, Kozo; Marumoto, Mitsuhiro
PA Mitsubishi Cable Industries, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 07161349	A2	19950623	JP 1993-340482	19931207
PRAI	JP 1993-340482		19931207		

AB A collector tape bearing a diffusion barrier layer of a conductor which hardly reacts with liquid Li or Li alloy in 1 or both sides and a wetting improving layer of a conductor having affinity for liquid Li or Li alloy on the barrier layer is passed to a coating bath of molten Li or Li alloy to form a Li or Li alloy coating with ≤30 μm thickness on the wetting improving layer and give an anode for Li secondary **batteries.** The anode has stability and evenness of properties, thickness, flatness, high strength, and could have a large surface area, and anode active mass hardly peels out of the anode, resulting in high capacity, energy d., and a long cycle life of a Li **battery** having the anode.
IC ICM H01M004-02
ICS H01M004-04
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST lithium **battery** anode tape
IT Anodes
(**battery**, secondary, lithium; manufacture of anodes with stable quality and large surface area)
IT 7429-90-5, Aluminum, uses 7439-89-6, Iron, uses 7439-92-1, Lead, uses 7439-93-2, Lithium, uses 7439-95-4, Magnesium, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-22-4,

Silver, uses **7440-31-5**, Tin, uses 7440-39-3, Barium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 7440-70-2, Calcium, uses 7440-74-6, Indium, uses **170929-23-4**
RL: DEV (Device component use); USES (Uses)
(manufacture of **anodes** for lithium **batteries** with high capacity and long cycle life)

IT **7440-31-5**, Tin, uses **170929-23-4**
RL: DEV (Device component use); USES (Uses)
(manufacture of **anodes** for lithium **batteries** with high capacity and long cycle life)

RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

RN 170929-23-4 HCAPLUS
CN Silver alloy, base, Ag 54,Li 33,Te 13 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ag	54	7440-22-4
Li	33	7439-93-2
Te	13	13494-80-9

L34 ANSWER 30 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1995:872092 HCAPLUS
DN 123:261733
TI Alloy for anode of lithium secondary **battery** and lithium secondary **battery**
IN Takada, Yoshinori; Marumoto, Mitsuhiro; Sasaki, Kouzou
PA Mitsubishi Cable Industries, Ltd., Japan
SO Eur. Pat. Appl., 12 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 668621	A1	19950823	EP 1995-102473	19950222
	R: DE, FR, GB				
	JP 07296811	A2	19951110	JP 1994-113683	19940428
	CA 2143047	AA	19950823	CA 1995-2143047	19950221
	JP 07288130	A2	19951031	JP 1995-34126	19950222
	JP 2968447	B2	19991025		
	US 5498495	A	19960312	US 1995-392217	19950222
PRAI	JP 1994-49869	A	19940222		
	JP 1994-113683	A	19940428		

AB The alloy is a Li-Ag-Te alloy with an atomic ratio of Li:Ag:Te of (15-120):(1-20):(0.001-2) or a Li-Ag-Te-M-M1 alloy with an atomic ratio of Li:Ag:Te:M:M1 of (15-120):(1-20):(0.001-2):(1-50):(1-30), where M is a Group 3-5A metal (Al, Si, In, Sn) and M1 is a transition metal (Zn, Fe, Co, Ni, Mn, Mo,W) other than Ag. The growth of dendrite is suppressed, charge-discharge capacity is high, energy d. is high and degradation due to repetitive charge-discharge is decreased. By using this anode, a Li secondary **battery** superior in charge-discharge cycle life, which

has high energy d. permitting long-term use, high electromotive force and high charge-discharge capacity, can be produced.

IC ICM H01M004-40
ICS H01M004-02; C22C024-00

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 56

ST lithium secondary **battery** anode alloy; silver tellurium lithium alloy anode

IT Anodes
(**battery**, lithium-silver-tellurium alloys for)

IT **169254-50-6 169254-51-7 169254-52-8**
169254-53-9 169254-54-0 169254-55-1
169254-56-2 169254-57-3 169254-58-4
169254-59-5 169254-60-8 169254-61-9
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(for **anodes** of lithium secondary **batteries**)

IT **169276-76-0**
RL: TEM (Technical or engineered material use); USES (Uses)
(for **anodes** of lithium secondary **batteries**)

IT 7429-90-5, Aluminum, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses **7440-31-5**, Tin, uses 7440-33-7, Tungsten, uses 7440-48-4, Cobalt, uses
RL: MOA (Modifier or additive use); USES (Uses)
(lithium-silver-tellurium alloys for **anodes** of lithium secondary **batteries** alloyed with)

IT **169254-50-6 169254-51-7 169254-52-8**
169254-53-9 169254-54-0 169254-55-1
169254-56-2 169254-57-3 169254-58-4
169254-59-5 169254-60-8 169254-61-9
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(for **anodes** of lithium secondary **batteries**)

RN 169254-50-6 HCAPLUS
CN Silver alloy, base, Ag 59,Li 34,Te 7 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ag	59	7440-22-4
Li	34	7439-93-2
Te	7	13494-80-9

RN 169254-51-7 HCAPLUS
CN Silver alloy, base, Ag 63,Li 36,Te 0.7 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ag	63	7440-22-4
Li	36	7439-93-2
Te	0.7	13494-80-9

RN 169254-52-8 HCAPLUS
CN Silver alloy, base, Ag 63,Li 37,Te 0.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ag	63	7440-22-4
Li	37	7439-93-2

Te	0.1	13494-80-9

RN 169254-53-9 HCAPLUS
CN Lithium alloy, base, Li 50,Ag 41,Te 9.6 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Li	50	7439-93-2
Ag	41	7440-22-4
Te	9.6	13494-80-9

RN 169254-54-0 HCAPLUS
CN Lithium alloy, base, Li 54,Ag 45,Te 1.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Li	54	7439-93-2
Ag	45	7440-22-4
Te	1.1	13494-80-9

RN 169254-55-1 HCAPLUS
CN Lithium alloy, base, Li 55,Ag 45,Te 0.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Li	55	7439-93-2
Ag	45	7440-22-4
Te	0.1	13494-80-9

RN 169254-56-2 HCAPLUS
CN Silver alloy, base, Ag 69,Li 25,Te 5.5 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ag	69	7440-22-4
Li	25	7439-93-2
Te	5.5	13494-80-9

RN 169254-57-3 HCAPLUS
CN Silver alloy, base, Ag 73,Li 27,Te 0.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ag	73	7440-22-4
Li	27	7439-93-2
Te	0.1	13494-80-9

RN 169254-58-4 HCAPLUS
CN Silver alloy, base, Ag 62,Li 36,Te 1.5 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ag	62	7440-22-4
Li	36	7439-93-2

Te	1.5	13494-80-9

RN 169254-59-5 HCAPLUS
CN Iron alloy, base, Fe 35,Ag 34,Li 20,Si 8.9,Te 2 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	35	7439-89-6
Ag	34	7440-22-4
Li	20	7439-93-2
Si	8.9	7440-21-3
Te	2	13494-80-9

RN 169254-60-8 HCAPLUS
CN Silver alloy, base, Ag 30,Zn 18,Li 17,In 16,Ni 16,Te 1.8 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ag	30	7440-22-4
Zn	18	7440-66-6
Li	17	7439-93-2
In	16	7440-74-6
Ni	16	7440-02-0
Te	1.8	13494-80-9

RN 169254-61-9 HCAPLUS
CN Silver alloy, base, Ag 37,Li 21,Ni 20,Si 19,Te 2.2 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ag	37	7440-22-4
Li	21	7439-93-2
Ni	20	7440-02-0
Si	19	7440-21-3
Te	2.2	13494-80-9

IT **169276-76-0**
RL: TEM (Technical or engineered material use); USES (Uses)
(for **anodes** of lithium secondary **batteries**)
RN 169276-76-0 HCAPLUS
CN Silver alloy, base, Ag 51-66,Li 26-49,Te 0.1-7.9 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ag	51 - 66	7440-22-4
Li	26 - 49	7439-93-2
Te	0.1 - 7.9	13494-80-9

IT **7440-31-5**, Tin, uses
RL: MOA (Modifier or additive use); USES (Uses)
(lithium-silver-tellurium alloys for **anodes** of lithium secondary **batteries** alloyed with)
RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

L34 ANSWER 31 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1994:249294 HCAPLUS
DN 120:249294
TI Secondary lithium **batteries** and their anodes
IN Peled, Emanuel; Lin, Aryeh
PA Ramot University Authority for Applied Research and Industrial Development Ltd., Israel
SO U.S., 12 pp.
CODEN: USXXAM
DT Patent
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 5283136	A	19940201	US 1992-893026	19920603
PRAI US 1992-893026		19920603		

AB The alloy of the **battery** anodes contains Li 2-30; Al ≥20; Mg ≥5; Cd, Zn, Sn, Pb, Si, In, Ga, Hg, and Sb ≤5% each and ≤40% in total; and As, P, Si, Ge, C, Fe, Ni, Cu, Cr, V, Co, Zn, Mo, Nb, and Mn ≤3% each and ≤20% in total. The alloy is such that during charge and discharge of the **battery**, the open-circuit curve as well as the voltage under working conditions vs. Li content of the anode are of a gradually sloping nature. The **batteries** have a solid polymer electrolyte.
IC ICM H01M004-38
ICS H01M006-16
INCL 429192000
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST lithium secondary **battery** anode; polymer electrolyte lithium **battery**
IT **Batteries**, secondary
(lithium)
IT Anodes
(**battery**, lithium alloy)
IT 7439-89-6, Iron, uses 7439-92-1, Lead, uses 7439-96-5, Manganese, uses 7439-97-6, Mercury, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-03-1, Niobium, uses 7440-21-3, Silicon, uses **7440-31-5**, Tin, uses 7440-36-0, Antimony, uses 7440-38-2, Arsenic, uses 7440-43-9, Cadmium, uses 7440-44-0, Carbon, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-55-3, Gallium, uses 7440-56-4, Germanium, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc, uses 7440-74-6, Indium, uses 7723-14-0, Phosphorus, uses
RL: USES (Uses)
(**anodes** containing, lithium alloy, for **batteries**)
IT **154598-93-3 154598-94-4 154598-95-5 154598-96-6 154598-97-7**
RL: USES (Uses)
(**anodes**, for **batteries**)
IT 1308-04-9, Cobalt oxide (Co2O3) 1313-13-9D, Manganese dioxide, lithiated 1317-38-0, Copper oxide (CuO), uses 7447-39-4, Copper dichloride, uses 7775-41-9, Silver fluoride 7783-90-6, Silver chloride, uses 10026-18-3, Cobalt trifluoride 10028-18-9, Nickel difluoride 11126-15-1, Lithium vanadium oxide 12013-10-4, Cobalt disulfide

12039-13-3, Titanium disulfide 12612-50-9, Molybdenum sulfide
154598-98-8, Cobalt lithium oxide (CoLi4O2)
RL: USES (Uses)
(cathodes, in lithium **batteries**)

IT 7439-93-2D, Lithium, polymer complexes 9002-86-2D, PVC, lithium complexes 9002-88-4D, Polyethylene, lithium complexes 9003-07-0D, Polypropylene, lithium complexes 9003-17-2D, Polybutadiene, lithium complexes 9010-98-4D, Polychloroprene, lithium complexes 9011-14-7D, Polymethyl methacrylate, lithium complexes 25014-41-9D, Polyacrylonitrile, lithium complexes 25322-68-3D, PEO, lithium complexes
RL: USES (Uses)
(electrolyte, in lithium **batteries**)

IT **7440-31-5**, Tin, uses
RL: USES (Uses)
(**anodes** containing, lithium alloy, for **batteries**)

RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

IT **154598-93-3 154598-94-4 154598-95-5**
154598-96-6 154598-97-7
RL: USES (Uses)
(**anodes**, for **batteries**)

RN 154598-93-3 HCAPLUS
CN Aluminum alloy, base, Al 46,Mg 41,Li 13 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	46	7429-90-5
Mg	41	7439-95-4
Li	13	7439-93-2

RN 154598-94-4 HCAPLUS
CN Aluminum alloy, base, Al 52,Mg 47,Li 1.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	52	7429-90-5
Mg	47	7439-95-4
Li	1.1	7439-93-2

RN 154598-95-5 HCAPLUS
CN Aluminum alloy, base, Al 43,Mg 41,Li 9.4,Ga 5.9 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	43	7429-90-5
Mg	41	7439-95-4
Li	9.4	7439-93-2
Ga	5.9	7440-55-3

RN 154598-96-6 HCAPLUS
CN Aluminum alloy, base, Al 71,Li 15,Sn 6.5,Mg 4.4,Ga 3.8 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	71	7429-90-5
Li	15	7439-93-2
Sn	6.5	7440-31-5
Mg	4.4	7439-95-4
Ga	3.8	7440-55-3

RN 154598-97-7 HCAPLUS
CN Aluminum alloy, base, Al 57,Mg 35,Li 7.4,Ga 1.5 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Al	57	7429-90-5
Mg	35	7439-95-4
Li	7.4	7439-93-2
Ga	1.5	7440-55-3

L34 ANSWER 32 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1989:216328 HCAPLUS
DN 110:216328
TI Secondary nonaqueous **batteries**
IN Eda, Nobuo; Koshina, Hide; Morita, Teruyoshi; Matsui, Toru; Nishikawa, Yukio
PA Matsushita Electric Industrial Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 01006369	A2	19890110	JP 1987-161780	19870629
PRAI	JP 1987-161780		19870629		

AB **Batteries** have polyaniline cathodes and **anodes** of Li+-insertable alloy having a potential V ≥0.27 V vs. Li at 20°. Preferably, the alloy contains In, Pb, **Sn**, and/or Bi, and has a Cd support. This prevents occlusion of Li ion into the cathode, and the **batteries** can easily recharged after excessive discharging. Thus, **batteries** having a electropolymd. polyaniline cathode, a 2.5M LiBF4/propylene carbonate-MeOC2H4OMe electrolyte, and an **anode** of a Pb-20 Cd-5% In disk pressed with a Li disk (V = 0.50 V after complete alloying between the disks) had longer charge-discharge life than **batteries** using **anode** having V = 0.15 V.
IC ICM H01M004-40
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST anode **battery** lithium alloy
IT Anodes
(**battery**, lithium-insertable alloy, electrode potential control of)
IT **Bismuth alloy**, nonbase
Tin alloy, nonbase
RL: USES (Uses)
(anodes, **lithium**-insertable, electrode potential control of,

for polyaniline **batteries**)
IT 7439-93-2P, Lithium, preparation
RL: **PREP (Preparation)**
(anodes, alloys for, electrode potential control of, for **batteries**)
IT 96781-59-8
RL: USES (Uses)
(anodes, lithium-insertable, electrode potential control of, for polyaniline **batteries**)

L34 ANSWER 33 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1988:634199 HCAPLUS
DN 109:234199
TI Secondary nonaqueous **batteries** with alloy anodes
IN Kita, Fusaji; Yoshimitsu, Kazumi; Kajita, Kozo; Manabe, Toshikatsu
PA Hitachi Maxell, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 7 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 63178448	A2	19880722	JP 1987-8719	19870116
PRAI JP 1987-8719		19870116		

AB Anodes of the title **batteries** consists of Li, In and ≥1 of Al, Si Sn, Pb and Sb. The alloy has essentially the same electrode potential as Li, and the anode can be a mixture of the alloy and Li. Thus, a Li plate and an In-14 atomic% Al plate were superposed with an electrolyte solution in between to obtain a Li-38.7 In-6.3 atomic% Al plate. When cycled at 4-mA discharging for 1.5 h and 2-mA charging for 3.0 h between 1.5 and 2.6 V, a **battery** using this plate as anode, a TiS2 cathode, and a 1M LiPF6/60:34.8:5.2 4-methyl-1,3-dioxolane-MeOC2H4OMe-HMPA electrolyte had higher end-of-discharge voltage than a **battery** using a Li-In anode.
IC ICM H01M004-40
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST anode **battery** lithium aluminum indium
IT Anodes
(**battery**, ternary lithium-indium alloy, for high discharge voltage)
IT 7439-92-1, uses and miscellaneous 7440-21-3, uses and miscellaneous **7440-31-5**, uses and miscellaneous 7440-36-0, uses and miscellaneous
RL: USES (Uses)
(**anodes** from indium-lithium alloys containing, for secondary nonaq. **batteries**)
IT **117798-34-2** 117798-35-3 **117798-36-4** **117798-37-5** **117798-38-6** **117798-39-7**
RL: USES (Uses)
(**anodes**, for secondary nonaq. **batteries**)
IT **7440-31-5**, uses and miscellaneous
RL: USES (Uses)
(**anodes** from indium-lithium alloys containing, for secondary nonaq. **batteries**)
RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

IT **117798-34-2 117798-36-4 117798-37-5**
117798-38-6 117798-39-7
RL: USES (Uses)
(**anodes**, for secondary nonaq. **batteries**)
RN 117798-34-2 HCAPLUS
CN Indium alloy, base, In 89,Li 7.6,Al 3.4 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
In	89	7440-74-6
Li	7.6	7439-93-2
Al	3.4	7429-90-5

RN 117798-36-4 HCAPLUS
CN Indium alloy, base, In 70,Li 29,Al 0.7 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
In	70	7440-74-6
Li	29	7439-93-2
Al	0.7	7429-90-5

RN 117798-37-5 HCAPLUS
CN Indium alloy, base, In 70,Li 29,Si 0.7 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
In	70	7440-74-6
Li	29	7439-93-2
Si	0.7	7440-21-3

RN 117798-38-6 HCAPLUS
CN Indium alloy, base, In 68,Li 29,Sn 2.8 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
In	68	7440-74-6
Li	29	7439-93-2
Sn	2.8	7440-31-5

RN 117798-39-7 HCAPLUS
CN Indium alloy, base, In 67,Li 28,Pb 4.8 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
In	67	7440-74-6
Li	28	7439-93-2
Pb	4.8	7439-92-1

L34 ANSWER 34 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 1987:141181 HCAPLUS
DN 106:141181
TI Manufacture of secondary nonaqueous **battery** cathodes
IN Yamaura, Junichi; Matsui, Toru; Toyoguchi, Yoshinori
PA Matsushita Electric Industrial Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 8 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 61239565	A2	19861024	JP 1985-80557	19850416
PRAI JP 1985-80557		19850416		

AB V2O5 and CrO3 are mixed with water to dissolve CrO3, and this mixture is heated (250-350°) in air to obtain CrxV2(1-x)O5-x(2+y) (x = 0.2-0.9, y = 0.1-1.0) cathode-active mass for secondary nonaq. **battery.** A **battery** using a **Li**-intercalated **Pb-Sn-Cd alloy anode**, a 1M LiClO4 in propylene carbonate electrolyte, and a Cr0.67V0.67O3.46 cathode had a discharge capacity of 53 mA-h vs. 50 mA-h for a control **battery** using dry-prepared cathode. At the 10th charge-discharge cycle, the **battery** had by 15% greater discharge capacity than the control **battery.**
IC ICM H01M004-58
ICS H01M004-02
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST **battery** chromium vanadium oxide cathode
IT Cathodes
(**battery**, chromium vanadium oxide for, manufacture of)
IT 107499-38-7P 107499-39-8P, Chromium vanadium oxide (Cr0.67V0.67O3.46)
RL: **PREP (Preparation)**
(manufacture of, for nonaq. **battery** cathodes)

L34 ANSWER 35 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1987:36079 HCAPLUS
DN 106:36079
TI Secondary nonaqueous **battery**
IN Yamaura, Junichi; Matsui, Tooru; Nankai, Shiro; Toyoguchi, Yoshinori
PA Matsushita Electric Industrial Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 12 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 61200668	A2	19860905	JP 1985-40429	19850301
PRAI JP 1985-40429		19850301		

AB Chromium vanadium oxide CrxV2(1-x)O5-(2+y)x where x = 0.2-0.9 and y= 0.1-1.0 is used as cathode active mass in a secondary **battery** with an alkali metal **anode** and an electrolyte of an alkali metal salt dissolved in an organic solvent. Thus, CrO3 and V2O5 were mixed and heated in air for 8-10 h, the y value of obtained compds. was independent of x but increased from 0.1 to 1.1 for heating at 200° and 600° resp. Mixts. of 0.2 g compound, carbon black and PTFE were applied on expanded Ti plates to form cathode, and used in button-type **batteries** having **Li**-occluded Pb-**Sn-Cd** **alloy anodes** and 1M LiCLO4 in propylene carbonate

electrolyte. The invention **batteries** had high capacity, high discharge voltage, and long cycle life.
IC ICM H01M004-58
ICS H01M010-40
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)
ST **battery** chromium vanadium oxide cathode
IT **Batteries**, secondary
(chromium vanadium oxide-lithium, nonaq.)
IT Cathodes
(**battery**, chromium vanadium oxide, manufacture and performance of nonaq.-)
IT 39318-26-8DP, Chromium vanadium oxide, oxygen deficient
RL: **PREP (Preparation)**
(cathodes, manufacture and performance of, for nonaq. **batteries**)

L34 ANSWER 36 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1980:557708 HCAPLUS
DN 93:157708
TI Thermodynamic analysis of polarization curves in alloy formation on molten cathodes
AU Morachevskii, A. G.; Demidov, A. I.; Temnogorova, N. V.; Nikitin, A. V.
CS Politekh. Inst., Chelyabinsk, USSR
SO Termodin. Svoistva Met. Rasplavov, Mater. Vses. Soveshch. Termodin. Met. Splavov (Rasplavy), 4th (1979), Volume 2, 132-5. Editor(s): Kozin, L. F. Publisher: Izd. Nauka Kazakhskoi SSR, Alma-Ata, USSR.
CODEN: 44BXAK
DT Conference
LA Russian
AB In relation to obtaining alloys by electrolysis as well as for developing **batteries** with molten electrolytes, galvanostatic polarization curves were plotted during Li deposition on a number of molten cathodes (Zn, Cd, In, Ga, Tl, Sn, Pb, Bi) from molten eutectic mixts. of LiCl-KCl and LiF-LiCl at 673 and 823 K. The depolarization values and thermodn. characteristics (free energies and activities) of alloy formation are given for c.d. 0.1 A/cm2. The surface concns. of Li in atomic fraction and g-atom/cm3 during electrolysis with molten Sn and Bi cathodes are also tabulated.
CC 72-6 (Electrochemistry)
Section cross-reference(s): 68, 69
ST thermodn polarization alloy formation melt; halide melt alloy formation lithium; lithium halide melt alloy formation
IT Electrolytic depolarization
(in lithium alloy formation on molten cathodes in halide melts)
IT Activity
(in lithium alloy formation, on molten cathodes in halide melts)
IT Thermodynamics
(of alloy formation in electrodeposition of lithium on molten cathodes from halide melts)
IT Free energy
(of formation, of lithium alloys with various metals from halide melts)
IT 7439-93-2, uses and miscellaneous
RL: TEM (Technical or engineered material use); USES (Uses)
(electrodeposition of, on molten cathodes from halide melts, alloy formation in relation to)
IT 39300-27-1P 39349-45-6P 61535-81-7P **73730-81-1P** **73730-82-2P** 75074-28-1P **75074-29-2P** **75074-30-5P**
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative); PREP (Preparation)

(formation of, in lithium **electrodeposition** on molten cathode from halide melts)

IT 7447-40-7, uses and miscellaneous 7447-41-8, uses and miscellaneous 7789-24-4, uses and miscellaneous
RL: TEM (Technical or engineered material use); USES (Uses)
(lithium alloy formation on molten cathodes from melts containing)

IT 7439-92-1, uses and miscellaneous 7440-28-0, uses and miscellaneous **7440-31-5**, uses and miscellaneous 7440-43-9, uses and miscellaneous 7440-55-3, uses and miscellaneous 7440-66-6, uses and miscellaneous 7440-69-9, uses and miscellaneous 7440-74-6, uses and miscellaneous
RL: TEM (Technical or engineered material use); USES (Uses)
(lithium **electrodeposition** on molten, from halide melts, alloy formation in relation to)

IT **73730-81-1P 73730-82-2P 75074-29-2P 75074-30-5P**
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative); PREP (Preparation)
(formation of, in lithium **electrodeposition** on molten cathode from halide melts)

RN 73730-81-1 HCAPLUS
CN Indium alloy, base, In,Li (9CI) (CA INDEX NAME)

Component	Component Registry Number
In	7440-74-6
Li	7439-93-2

RN 73730-82-2 HCAPLUS
CN Bismuth alloy, base, Bi,Li (9CI) (CA INDEX NAME)

Component	Component Registry Number
Bi	7440-69-9
Li	7439-93-2

RN 75074-29-2 HCAPLUS
CN Gallium alloy, base, Ga,Li (9CI) (CA INDEX NAME)

Component	Component Registry Number
Ga	7440-55-3
Li	7439-93-2

RN 75074-30-5 HCAPLUS
CN Cadmium alloy, base, Cd,Li (9CI) (CA INDEX NAME)

Component	Component Registry Number
Cd	7440-43-9
Li	7439-93-2

IT **7440-31-5**, uses and miscellaneous
RL: TEM (Technical or engineered material use); USES (Uses)
(lithium **electrodeposition** on molten, from halide melts, alloy formation in relation to)

RN 7440-31-5 HCAPLUS
CN Tin (8CI, 9CI) (CA INDEX NAME)

Sn

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